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NOVEMBER 2022

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Trends[®] magazine



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Brief Summary: Cats and Dogs - This information is not comprehensive. Before using PROZINC, please consult the product insert, a summary of which follows. The product insert may be obtained from your veterinarian or by visiting www.prozinc.us.

ProZinc® (protamine zinc recombinant human insulin)

40 IU/mL

Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

Description: PROZINC® is a sterile aqueous protamine zinc suspension of recombinant human insulin.

Each mL contains: recombinant human insulin 40 International Units (IU), protamine sulfate 0.466 mg, zinc oxide 0.088 mg, glycerin 16.00 mg, dibasic sodium phosphate, heptahydrate 3.78 mg, phenol (added as preservative) 2.50 mg, hydrochloric acid 1.63 mg, water for injection (maximum) 1005 mg, pH is adjusted with hydrochloric acid and/or sodium hydroxide.

Indication: PROZINC (protamine zinc recombinant human insulin) is indicated for the reduction of hyperglycemia and hyperglycemia-associated clinical signs in cats and dogs with diabetes mellitus.

Contraindications: PROZINC is contraindicated in cats and dogs sensitive to protamine zinc recombinant human insulin or any other ingredients in PROZINC. PROZINC is contraindicated during episodes of hypoglycemia.

Warnings:

User Safety: For use in cats and dogs only. Keep out of the reach of children. Avoid contact with eyes. In case of contact, immediately flush eyes with running water for at least 15 minutes. Accidental injection may cause hypoglycemia. In case of accidental injection, seek medical attention immediately. Exposure to product may induce a local or systemic allergic reaction in sensitized individuals.

Animal Safety: Owners should be advised to observe for signs of hypoglycemia. Use of this product, even at established doses, has been associated with hypoglycemia. A dog or cat with signs of hypoglycemia should be treated immediately. Glucose should be given orally or intravenously as dictated by clinical signs. Insulin should be temporarily withheld and, if indicated, the dosage adjusted.

Any change in insulin should be made cautiously and only under a veterinarian's supervision. Changes in insulin strength, manufacturer, type, species (human, animal) or method of manufacture (rDNA versus animal-source insulin) may result in the need for a change in dosage.

Appropriate diagnostic tests should be performed to rule out other endocrinopathies in diabetic dogs and cats that are difficult to regulate.

Precautions: Cats and dogs presenting with severe ketoacidosis, anorexia, lethargy, and/or vomiting should be stabilized with short-acting insulin and appropriate supportive therapy until their condition is stabilized. As with all insulin products, careful patient monitoring for hypoglycemia and hyperglycemia is essential to attain and maintain adequate glycemic control and to prevent associated complications. Overdose can result in profound hypoglycemia and death.

Glucocorticoids, progestogens, and certain endocrinopathies can have an antagonistic effect on insulin activity. Glucocorticoid and progestogen use should be avoided.

The safety and effectiveness of PROZINC in breeding, pregnant, and lactating cats and dogs has not been evaluated.

The safety and effectiveness of PROZINC in kittens and puppies has not been evaluated.

Adverse Reactions - Cats: In a 45-day effectiveness field study, 176 cats received PROZINC. Hypoglycemia (low blood sugar) was the most common reported adverse event. Clinical signs of hypoglycemia were generally mild in nature (described as lethargic, sluggish, weak, trembling, uncoordinated, groggy, glassy-eyed or dazed).

In severe cases of hypoglycemia, seizures and coma can occur. Hypoglycemia can be fatal if an affected cat does not receive prompt treatment.

Local transient injection site reactions may occur.

Dogs: In a 182-day field study, 276 dogs received PROZINC. The most common adverse reactions were lethargy, anorexia, hypoglycemia (low blood sugar), vomiting, seizures, shaking, diarrhea, and ataxia.

Clinical signs of hypoglycemia varied and included seizure, collapse, ataxia, staggering, trembling, twitching, shaking, disorientation, lethargy, weakness, and vocalization.

Information for Cat Owners: PROZINC, like other insulin products, is not free from adverse reactions. Owners should be advised of the potential for adverse reactions and be informed of the associated clinical signs.

The most common adverse reaction observed is hypoglycemia (low blood sugar). Signs may include: weakness, depression, behavioral changes, muscle twitching, and anxiety. In severe cases of hypoglycemia, seizures and coma can occur. Hypoglycemia can be fatal if an affected cat does not receive prompt treatment.

Local transient injection site reactions may occur.

Appropriate veterinary monitoring of blood glucose, adjustment of insulin dose and regimen as needed, and stabilization of diet and activity help minimize the risk of hypoglycemic episodes. The attending veterinarian should evaluate other adverse reactions on a case-by-case basis to determine if an adjustment in therapy is appropriate, or if alternative therapy should be considered.

Information for Dog Owners: PROZINC, like other insulin products, is not free from adverse reactions. Owners should be advised of the potential for adverse reactions and be informed of the associated clinical signs.

The most common adverse reaction observed is hypoglycemia. Signs may include weakness, depression, behavioral changes, muscle twitching, and anxiety. In severe cases of hypoglycemia, seizures and coma can occur. Hypoglycemia can be fatal if an affected dog does not receive prompt treatment.

Appropriate veterinary monitoring of blood glucose, adjustment of insulin dose and regimen as needed, and stabilization of diet and activity help minimize the risk of hypoglycemic episodes. The attending veterinarian should evaluate other adverse reactions on a case-by-case basis to determine if an adjustment in therapy is appropriate, or if alternative therapy should be considered.

Effectiveness - Cats: A total of 187 client-owned cats were enrolled in a 45-day field study, with 176 receiving PROZINC. One hundred and fifty-one cats were included in the effectiveness analysis. The patients included various purebred and mixed breed cats ranging in age from 3 to 19 years and in weight from 4.6 to 20.8 pounds.

Effectiveness was based on successful control of diabetes which was defined as improvement in at least one blood glucose variable (glucose curve mean, nadir, or fructosamine) and at least one clinical sign (polyuria, polydipsia, or body weight). Based on this definition, 115 of 151 cases (76.2%) were considered successful.

Dogs: A total of 276 client-owned dogs were enrolled in an 84-day field study followed by a 98-day extended-use phase with 276 dogs receiving PROZINC. The dogs included various purebred and mixed breed dogs ranging in age from 2 to 16 years and in weight from 3.3 to 123 pounds.

Effectiveness was based on successful control of diabetes which was defined as improvement in at least one laboratory variable (blood glucose curve mean, blood glucose curve nadir, or fructosamine) and at least one clinical sign (polyuria, polydipsia, or weight loss). Based on this definition, 162 of 224 cases (72%) were considered successful.

Approved by FDA under NADA # 141-297

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Duluth, GA 30096

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PROZINC® (protamine zinc recombinant human insulin) treatment for diabetes mellitus is the only FDA-approved animal insulin made with recombinant technology. It's also the only product with protamine zinc, which supports optimal glycemic control and appropriate duration of action. To learn more, contact your Boehringer Ingelheim Sales Representative.



ProZinc®
(protamine zinc recombinant
human insulin)

IMPORTANT SAFETY INFORMATION: PROZINC® (protamine zinc recombinant human insulin) is for use in dogs and cats only. Keep out of the reach of children. Owners should be advised to observe for signs of hypoglycemia (low blood sugar). Signs may include weakness, depression, behavioral changes, muscle twitching, and anxiety. In severe cases of hypoglycemia, seizures and coma can occur. Hypoglycemia can be fatal if an affected animal does not receive prompt treatment. PROZINC should not be used during episodes of hypoglycemia (low blood sugar). Appropriate veterinary monitoring of blood glucose, adjustment of insulin dose and regimen as needed, and stabilization of diet and activity help minimize the risk of hypoglycemic episodes. The attending veterinarian should evaluate other adverse reactions on a case-by-case basis to determine if an adjustment in therapy is appropriate, or if alternative therapy should be considered. The safety and effectiveness of PROZINC in puppies, kittens, or breeding, pregnant, and lactating animals has not been evaluated. **For more information, see full prescribing information.**

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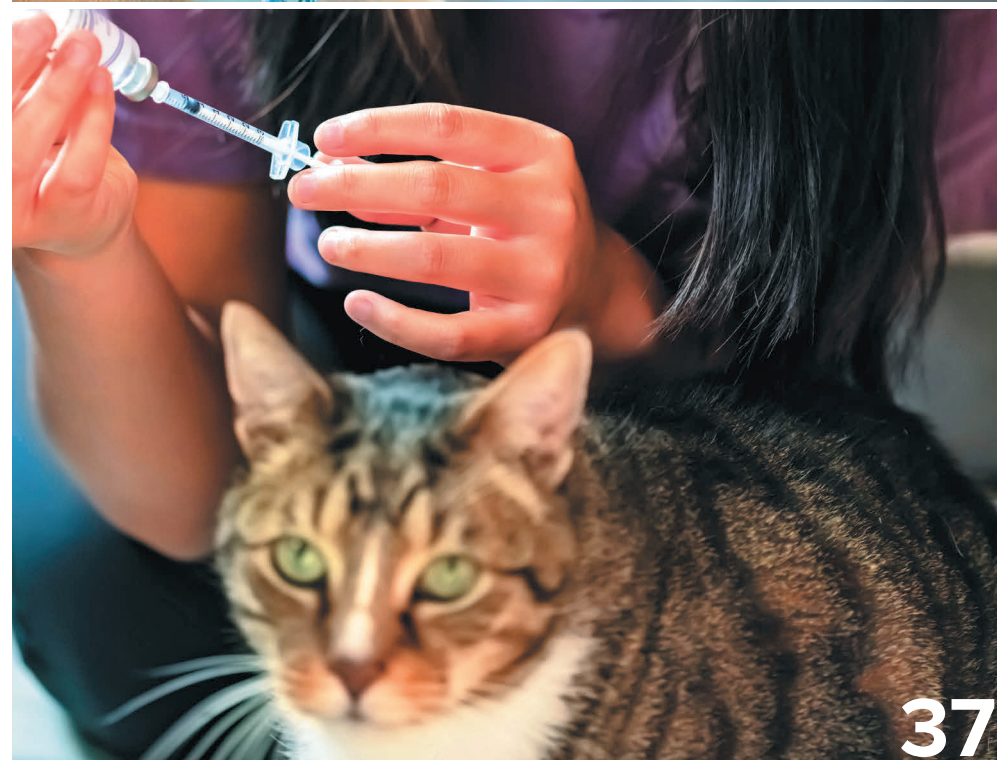
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from the editor's desk

THE SUBJECT OF SENIOR CARE IS NEAR AND DEAR TO MY HEART, not only because I have an aging goldendoodle and octogenarian parents, but I am also turning 50 this year. I know, 50 doesn't qualify for any discounts, but it always seemed like a very ripe age, which I have now achieved (or will have done, by the time this is published). In any case, the main feature this month is on individualized care for senior pets, and how practitioners can better serve older pets and clients (like me) through improved communication and a little planning.

Along with this article is a sampling of anecdotes lifted from the AAHA Community. I asked if some people would share their stories of senior pets, and they delivered. Make sure to give it a read and then head over to community.aaha.org to share your knowledge with the larger AAHA Community.

Speaking of getting older and aching joints, have you ever wondered how a therapeutic laser works? This month, our own Ingrid Taylor, DVM, explores photobiomodulation with a nifty infographic on how they work.

In case you hadn't noticed, we are featuring excerpts from *Central Line: The AAHA Podcast* each month. This month in *Trends*, we feature an interview with two pet owners who were faced with a diabetes diagnosis for their cat. The interview sheds some light on how clients might feel when dealing with such a diagnosis, and how the veterinary team can help.

COMING NEXT MONTH

Coming up in December, we'll have an article on exotics, an update on stem cells and managing client expectations related to stem cells, and a podcast excerpt from an interview with two experts on antimicrobial resistance.

As always, let me know what you think at trends@aaha.org.

—Ben Williams, Editor

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View from the Board

Seniors Are Magic

I have a secret to share with you. Like the majority of veterinarians, I do love our puppy and kitten patients, but my most favorite patients are the curmudgeonly cats and crusty old dogs, and especially the eternally angry Chihuahuas. They've earned a special place in my heart.

Our practice, like many, has been blessed with some amazing clients who adopt the oldest pets at our area shelters to ensure a loving home at the end of their life. As one owner of a new senior adoptee recently said, "It breaks my heart to think of a pet relinquished to a shelter in their senior years and we decided we could act locally to take care of one more in our household with love." I hope that we continue to encourage, recognize, and support these owners with extra heart.

There is so much that we can accomplish in supporting our senior patients through all their changes. Every year is bringing new tools, medications, and other advances for their benefit. A great starting point is the many resources available in a large number of our AAHA guidelines to assist in the care of our mature and senior canines and felines. This issue of *Trends* also highlights newer resources for senior care.

And with aging inevitably comes changes, including many potential health issues, from arthritis to diabetes. Make sure that you utilize the updates made in caring for diabetic patients in this issue and online at aaha.org. Our *2018 AAHA Diabetes Management Guidelines for Dogs and Cats* is full of valuable resources to help ease your journey managing this very individual and sometimes frustrating disease.

Make sure you refer to the *2022 AAHA Pain Management Guidelines for Dogs and Cats* and its variety of tools to help assess pain in our stoic patients and develop a therapy plan with both pharmacologic and nonpharmacologic modalities. One of the great tools in our practice has been cold laser therapy. There is a unit that is reasonably priced for any practice, making it feasible to gain a pain management tool and a small stream of revenue.

Having been around so many special animals all my life, a part of my love of our profession is in helping these pets age with comfort and grace, along with assisting their owners through the difficult emotional ride that is the end of the life of a beloved pet. We have to fill the huge need to communicate, educate, and work through end-of-life considerations from palliative care and hospice to euthanasia while balancing the sometimes uncomfortable human emotions.

This is an essential part of our work as veterinarians, but it can be a significant part of our emotional stress and distress as practitioners and individuals. The good news is that there are guidelines resources in the *2016 AAHA/IAAHPC End-of-Life Care Guidelines* to help not only patients but also ourselves and our teams.

Thank you for the excellent care you all take of our magical senior patients.

Margot K. Vahrenwald, DVM, CVJ, is president of the AAHA Board of Directors. She is the owner of Park Hill Veterinary Medical Center in Denver, Colorado.



This month in AAHA's Publicity Toolbox . . .

Here are the downloadable social media images available for AAHA-accredited members at aaha.org/publicity this month:

Pet Cancer Awareness Month

Pet Diabetes Month

Adopt a Senior Pet Month

Daylight Saving Time

November 6

Veterans Day

November 11

Happy Thanksgiving

November 24

November is Pet Diabetes Month.

Reduce your pet's risk:



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Provide proper nutrition



Visit an AAHA-accredited hospital regularly



Do you use FreeStyle Libre in cats?

We have a bit of a debate between the doctors at our hospital at the moment regarding if this is necessary for monitoring diabetic cats. Do any of you guys use these regularly in cats?



Community

A: I do not use them. However, I have spoken with people that do. It seems to be a faster regulation, but the challenge is keeping the implant on the animal. In addition, the implant lasts for 10 days, so it is not a permanent fixture, making diagnosing remissions back to the at-home glucometers. I have had the most luck with lancets and Test Buddy glucometers. These glucometers are calibrated to species and are pretty cheap.

A: This does seem like a good way to monitor glucose. Really whatever will make the owners life easier. I am sure it works better for certain patients.

A: We use them semi-regularly, largely depends on the cat's temperament and the owner's comfort level and finances. We generally present it as an option and go over the pros and cons with the owner of that versus in-house glucose curves versus at-home glucometer use.

Don't miss out on the conversations like this one happening at community.aaha.org!

Questions about your membership? Email aaha@aaha.org.

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Laverdia™-CA1

(verdinexor tablets)

Conditionally approved by FDA pending a full demonstration of effectiveness under application number 141-526

Antineoplastic Tablets

For Dogs Only

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian. Use only as directed. **It is a violation of the law to use this product other than as directed in the labeling.**

BRIEF SUMMARY (for full prescribing information, see package insert)

DESCRIPTION: Laverdia-CA1 (verdinexor tablets) is a selective inhibitor of nuclear export (SINE) that blocks chromosome region maintenance 1 (CRM1).

INDICATION: Laverdia-CA1 is indicated for the treatment of lymphoma in dogs.

CONTRAINDICATIONS:

Do not use in dogs that are pregnant, lactating or intended for breeding. Laverdia-CA1 is a possible teratogen and can affect female and male fertility.

WARNINGS: NOT FOR USE IN HUMANS. KEEP THIS AND ALL MEDICATIONS OUT OF THE REACH OF CHILDREN. CHILDREN SHOULD NOT COME INTO CONTACT WITH LAVERDIA-CA1. Children should not come in contact with the feces, urine, vomit, or saliva of treated dogs.

Pregnant women, women who may become pregnant, and nursing women should not handle or administer Laverdia-CA1 or come in contact with the feces, urine, vomit, or saliva from Laverdia-CA1-treated dogs.

Laverdia-CA1 may cause birth defects and can affect female fertility based on animal studies.

Wear protective disposable chemotherapy resistant gloves when handling Laverdia-CA1 to avoid exposure to drug.

Wear protective disposable chemotherapy resistant gloves to prevent direct contact with moistened, broken, or crushed Laverdia-CA1 tablets and prevent direct contact with feces, urine, vomit, and saliva during treatment and for **3 days** after the dog has received the last treatment. Place all waste material in a plastic bag and seal before general disposal. Wash hands immediately and thoroughly with soap and water if contact occurs with the feces, urine, vomit, or saliva from Laverdia-CA1 treated dogs.

Any items that come in contact with feces, urine, vomit, or saliva should not be washed with other laundry during treatment and for **3 days** after the last treatment with Laverdia-CA1.

Wear protective disposable chemotherapy resistant gloves when handling the dog's toys, food bowl, and water bowl. Wash food and water bowls separately from other items during treatment and for **3 days** after the dog has received the last treatment.

If Laverdia-CA1 is accidentally ingested, or if there is significant contact with feces, urine, vomit or saliva of dogs during treatment or within **3 days** after the last treatment without proper precautions, seek medical advice immediately. It is important to show the treating physician a copy of the package insert, label, or client information sheet.

Special instructions for handling and administering the product
It is recommended that Laverdia-CA1 be administered under the supervision of, or in consultation with, a veterinarian experienced in the use of cancer therapeutic agents.

Do not store near food, in or near a food preparation area, or with medications intended for use in humans.

Skin contact

In case of contact with the skin, wash the affected area immediately and thoroughly with soap and water.

Accidental eye exposure

Rinse the eyes with large amounts of tap water (use eyewash station if present) for 10 minutes while holding back the eyelid.

Remove contact lenses.

Seek medical advice immediately and show the package insert or label to the physician.

Accidental oral exposure or ingestion

Seek medical advice immediately and show the package insert or label to the physician.

Animal Safety Warnings

Laverdia-CA1 can cause severe anorexia. Patients should be carefully monitored for inappetence, vomiting, diarrhea and dehydration, and supportive care should be provided as clinically indicated. Keep Laverdia-CA1 in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

PRECAUTIONS: Safe use of Laverdia-CA1 has not been evaluated in dogs with concurrent serious infections; concurrent renal, cardiovascular, or hepatic disease; in dogs with diabetes mellitus; in dogs with clinically relevant hypercalcemia; in dogs with concurrent malignancy or dogs younger than 7 months of age.

Laverdia-CA1 can cause hematologic and serum chemistry abnormalities. Dogs should be frequently monitored for evidence of hematologic and serum chemistry abnormalities when initiating and maintaining treatment with Laverdia-CA1 (see ADVERSE REACTIONS).

The safety and effectiveness of Laverdia-CA1 has not been evaluated in conjunction with other chemotherapeutic agents or other treatment modalities for lymphoma.

ADVERSE REACTIONS: The most common adverse events reported during the course of a US field study supporting reasonable expectation of effectiveness were lethargy, fever, weakness, generalized pain, anorexia, vomiting, diarrhea, polyuria, polydipsia, hematuria, proteinuria, elevated liver enzymes, bilirubinuria, cough/dyspnea, weight loss, blood cell abnormalities, subcutaneous edema, and pyoderma. Less common adverse reactions seen were protein losing nephropathy, urinary incontinence, hepatomegaly, elevated bilirubin, icterus, heart murmur, arrhythmia, heart block, blood protein abnormalities, prolonged prothrombin time, seizure, tremor, disorientation, corneal opacity, skin bruising, redness, loss of hair, nasal discharge, epistaxis, lymphadenitis and platelet abnormalities.

To report suspected adverse events, for technical assistance or to obtain a copy of the SDS, contact Dechra Veterinary Products at 1-833-264-8483. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at <http://www.fda.gov/reportanimalae>.

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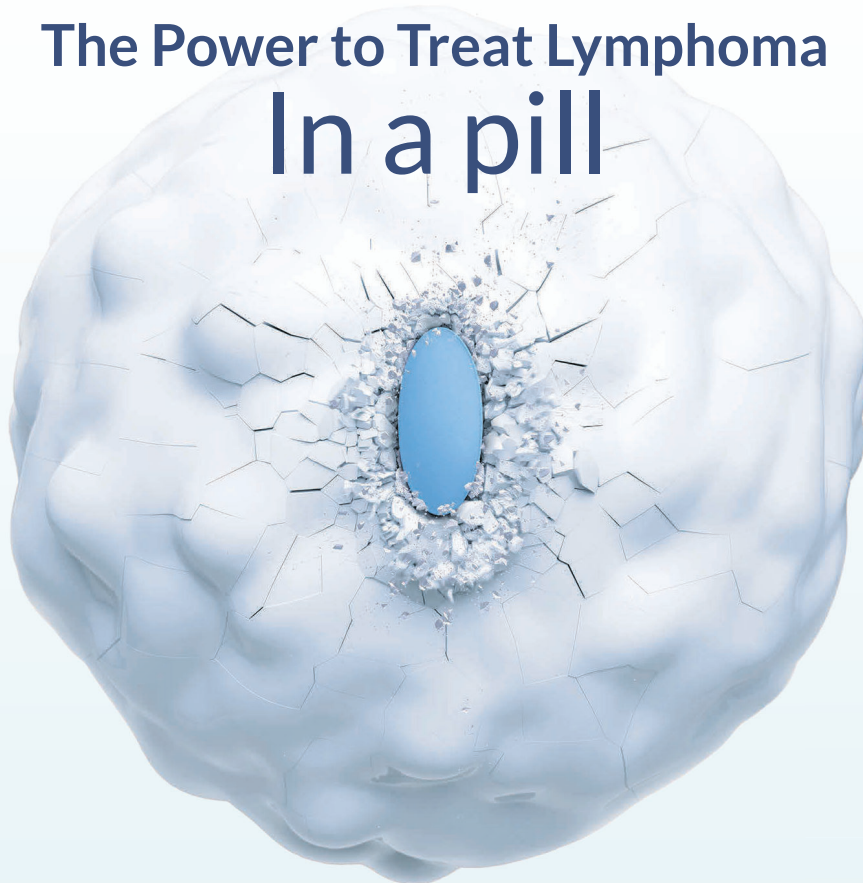




LAVERDIA™-CA1 (verdinexor tablets)

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The Power to Treat Lymphoma In a pill



A novel treatment option for canine lymphoma patients

Important Safety Information

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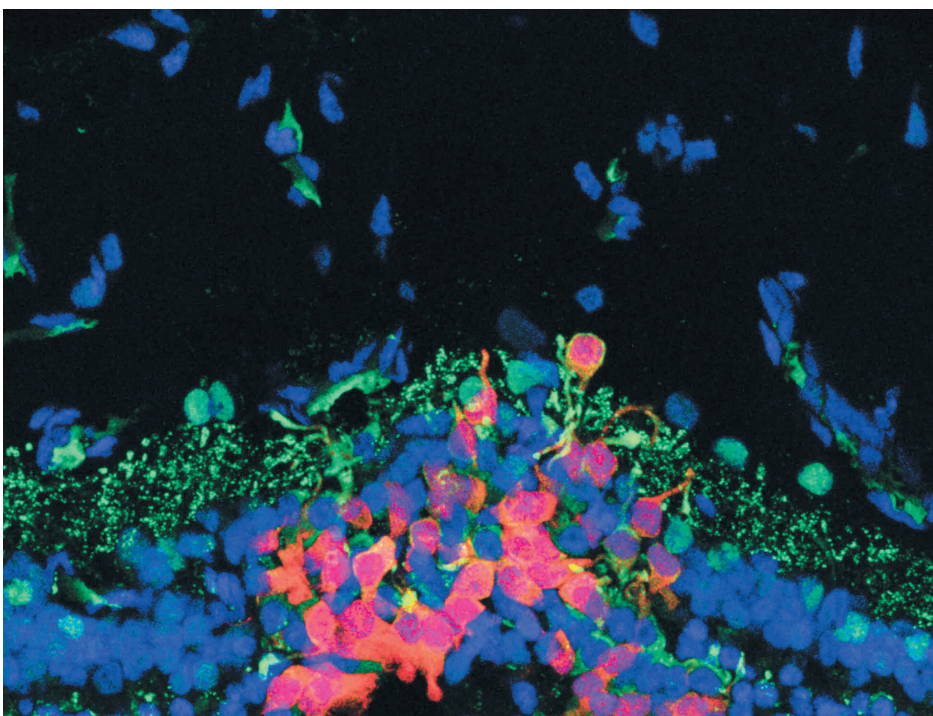


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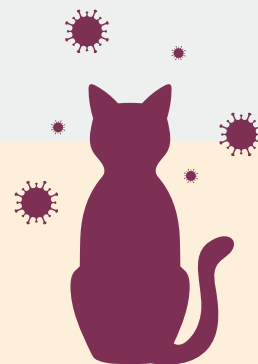
Progress Toward a Stem Cell–Based Therapy for Blindness

A multi-institutional effort is taking steps to develop a technique to regenerate photoreceptor cells and restore sight in people with vision disorders. The work, led by a team at the University of Pennsylvania School of Veterinary Medicine, in collaboration with researchers at the University of Wisconsin-Madison, Children's Hospital of Philadelphia, and the National Institutes of Health's National Eye Institute, introduced precursors of human photoreceptor cells into the retinas of dogs. A cocktail of immunosuppressive drugs enabled the cells to survive in the recipients' retinas for months, where they began forming connections with existing retinal cells. The study is published in the journal *Stem Cell Reports*.

"In this study, we wanted to know if we could, one, improve the surgical delivery of these cells to the subretinal space; two, image the cells *in vivo*; three, improve their survival; and four, see them migrate to the layer of the retina where they should be and start integrating," says William Beltran, a professor of ophthalmology at Penn Vet and senior author on the study. "The answer to all those questions was yes."



Following a transplantation procedure, human photoreceptor precursor cells labeled red migrated and integrated into a degenerated canine retina. The green label is a synaptic marker, suggesting the transplanted cells began forming a connection with second-order neurons in the retina.



UC Davis Launches Clinical Trials to Treat Coronavirus Disease in Cats

Scientists from the University of California-Davis School of Veterinary Medicine have launched clinical trials focused on improving treatments for feline infectious peritonitis, or FIP, and are currently enrolling patients at the UC Davis veterinary hospital.

One trial will compare whether cats improve when treated with one of two closely related antiviral drugs. The first drug, remdesivir, is an antiviral drug with emergency use authorization from the Food and Drug Administration to treat COVID-19. If fully licensed, veterinarians could prescribe it to affected cats in the future. The second drug, GS-441524, is closely related to remdesivir.

The other trial, funded by the National Institute of Child Health and Development, will examine if antiviral drugs combined with a new stem cell therapy using mesenchymal stem cells, or MSCs, improve response to treatment for FIP.

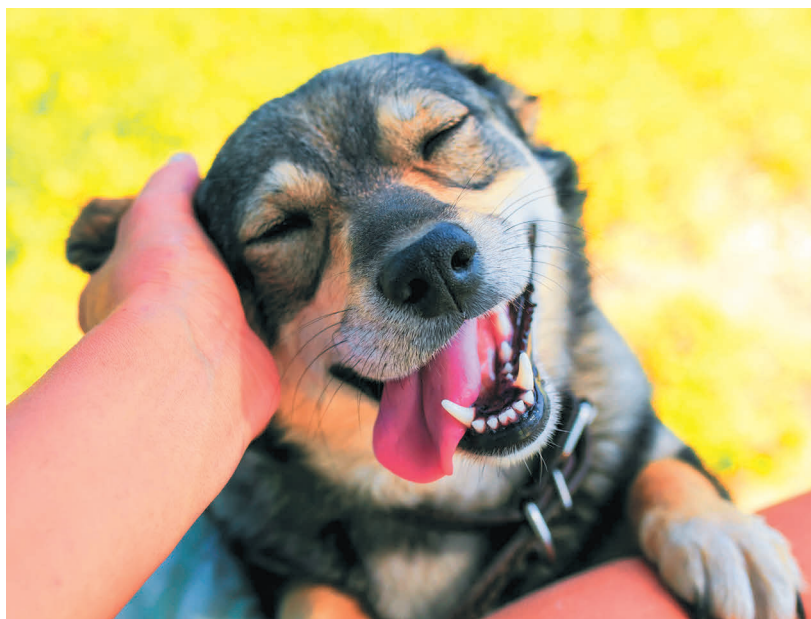
The school reports that the trial could help humans as well. It is part of a larger study looking into new treatments for multisystem inflammatory syndrome in children, or MIS-C, a condition that causes organs and other body parts to become inflamed.

Dogs' Eyes Tear Up When Reunited with Owners

Research from Takefumi Kikusui, PhD, a professor at the Laboratory of Human-Animal Interaction and Reciprocity at Azabu University in Japan, suggests that a dog's eyes may well up with tears of happiness when reunited with their owner after a period of absence.

Kikusui reports that he decided to investigate dog tears after watching one of his two standard poodles when she had puppies six years ago. He noticed that her eyes got teary as she nursed her puppies. "We found that dogs shed tears associated with positive emotions," Kikusui, who coauthored the research that was published in the journal *Current Biology*, said in a news release. He relates that the team made the discovery of oxytocin as a possible mechanism underlying it, referring to the hormone that in humans is sometimes called the love or maternal hormone.

Researchers stated that there is much they still don't know about dog tears, including whether they cry in response



to negative emotions as humans do, or if a dog's ability to tear up plays a social function in the canine world. Kikusui said it was possible humans would better care for dogs that got teary-eyed. His team showed 74 people pictures of dogs' faces with and without artificial tears in them and asked them to rank the animals. People gave more positive responses when they saw dogs with teary eyes.



Diabetes in Dogs Associated with Season, Region

Research published in the journal *PLOS ONE* looked at 960 pet dogs with diabetes mellitus living across the United States. Researchers from the University of Pennsylvania School of Veterinary Medicine found that diabetes diagnoses were significantly more likely to occur in the winter and in the northern US compared with any other season or region. They report that although the findings don't explain the underlying cause of this correlation, the link with cold weather hints at future possibilities to pursue.

Hypotheses about the connection between colder and more northerly climates and diabetes diagnoses in humans include links to vitamin D deficiency, diet, lifestyle, and viral infections. In dogs, the diet connection seems unlikely, says Rebecka Hess, BSc, DVM, DACVIM, a professor at Penn Vet and senior author on the study, as most dog owners feed their pets a commercially available kibble, no matter their location or the season. In addition, she says, overweight and obese dogs aren't at higher risk of developing diabetes, so a connection with exercise, or lack thereof, seems unlikely.

Study Validates CBTC Criteria for Diagnosing Canine Glioma

A multi-institutional team led by North Carolina State University reports that researchers found that using recently released criteria for the diagnosis of canine glioma resulted in strong diagnostic consensus among pathologists. Researchers report that the findings not only pave the way for more standardized diagnostic criteria for dogs with brain tumors but also create a useful baseline to support larger interinstitutional studies that could aid dogs and humans with glioma.

“The CBTC (Comparative Brain Tumor Consortium) system of diagnostic criteria could be very useful not only in the clinical diagnosis of canine patients but also in enabling interinstitutional research collaboration, since it has everyone speaking the same language, diagnostically speaking,” says Gregory Krane, DVM, PhD, DACVP, colead author of the paper. “To that end, we wanted to conduct a real-world assessment of the system.”

Krane obtained 85 glioma samples taken from dogs examined at NC State between 2006 and 2018. Five pathologists—one human-medicine neuropathologist, two veterinary neuropathologists, and two veterinary pathologists without subspecialty training in neuropathology—separately examined the samples using the CBTC guidelines.

“The study also shows that even with detailed diagnostic criteria, pathologist consensus is often not 100%. For a clinical setting, practitioners should be comfortable talking with their pathologist if the diagnosis is not compatible with the rest of the clinical picture, and in the research setting, investigators can strengthen their studies by incorporating groups of pathologists into the diagnostic review,” researchers say. The study appears in *Veterinary and Comparative Oncology*.

QUOTE OF THE MONTH

“Far and away the best prize that life offers is the chance to work hard at work worth doing.”

—Theodore Roosevelt



Coast Guard Shallow-Water Response Team 3 crewmembers rescue pets from rising flood waters caused by Hurricane Florence in North Carolina on Sept. 18, 2018.

Senate Passes Bipartisan Bill to Protect Pets and Other Animals During and After Natural Disasters

Bipartisan legislation to help protect pets and other animals during and in the aftermath of natural disasters and emergencies has passed the Senate. The Planning for Animal Wellness (PAW) Act directs the Administrator of the Federal Emergency Management Agency (FEMA) to establish an advisory group with outside experts that will align FEMA guidance to match current best practices in animal care for disaster preparedness, response, and recovery. The bill now moves to the United States House of Representatives for consideration.

The PAW Act would require the FEMA Administrator to establish an advisory group to encourage and foster collaborative efforts among individuals and entities working to address the needs of animals in disaster preparedness. The working group will review current best practices and federal guidance on sheltering and evacuation planning for household pets, service and assistance animals, and other animals, as appropriate. If the Administrator, in consultation with the working group, finds that current federal guidance does not meet best practices, FEMA is required to publish updated guidance in consultation with the advisory group.

Different Levels of Dog-Owner Bond Are Reflected in Dogs' Sleep

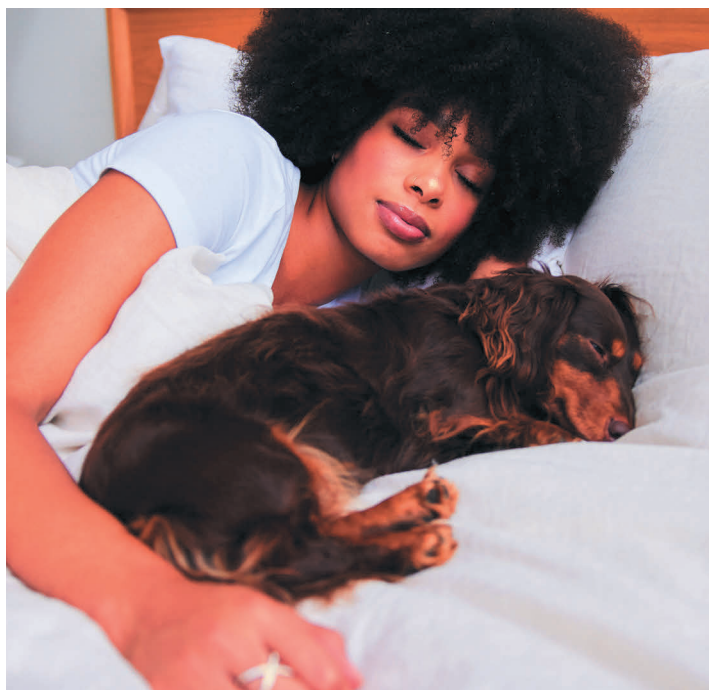
Researchers of the Department of Ethology at Eötvös Loránd University, Hungary, report that they have provided the first evidence that the sleep pattern of dogs who slept in a new place with their owner was influenced by the dog-owner attachment bond.

The dog-owner attachment bond has already been studied in a number of behavioral tests; this time the researchers wanted to know whether in dogs, similarly to children, attachment has an effect on the quality of sleep in a new environment.

The attachment bond of 42 dogs to their owners was measured using the adapted version of the Strange Situation Test, developed by psychologists to assess human infant-mother bond.

Researchers found higher attachment scores to be associated with spending more time in deep sleep, known as the most relaxing sleep phase.

“Sleeping in a new place for the first time can be stressful. But these results suggest that dogs with higher attachment scores sleep better, presumably because the owner of these dogs provides a more secure environment for their dog; thus, they can relax and have a good nap,” says the first author Cecília Carreiro, PhD. The study was published in the journal *Animals*.



A cat involved in the study rolls on leaves belonging to the silver vine plant.

Catnip Repels Mosquitos

A research group at Iwate University, Nagoya University, Kyoto University, and University of Liverpool conducted research on catnip and silver vine, which have been known as cat attractant plants. They report that their research, published in the journal *iScience*, found that the behavior had more practical reasons than creating a feeling of euphoria.

“The first appearance of silver vine (*Matatabi* in Japanese) as a cat attractant in literature in Japan dates back to more than 300 years ago. A folklore Ukiyo-e (a genre of Japanese woodblock prints and paintings) drawn in 1859 shows a group of mice trying to tempt some cats with a smell of silver vine. Still, benefits of the cats' response had remained unknown,” says Masao Miyazaki, PhD, of Iwate University, a leader of the research project.

The research group first identified the active ingredient of silver vine that induces the response. They isolated substances from extract of silver vine leaves and administered each of them to cats to examine the response. The experiment revealed that nepetalactol, a novel substance, most strongly induces the characteristic behavior. The research group believed that the plant has another biologically important function as the reaction was already shown in feline animals when they evolved from other species about 10 million years ago. On the basis of some reports that nepetalactone has mosquito repellent activity, researchers tested the mosquito repellent property of nepetalactol on cats. They found that the cats' reaction to silver vine is chemical defense against mosquitoes, and perhaps against viruses and parasitic insects.



Dr. Stephanie McGrath (right) and Breonna Thomas (left) work with a golden retriever for a clinical trial at the James L. Voss Veterinary Teaching Hospital.

CSU Trial Studies Canine and Human Dementia

A new study is underway at the Colorado State University James L. Voss Veterinary Teaching Hospital to understand the response to three different medications in the treatment of canine cognitive dysfunction syndrome (CCDS) in aging dogs, with the long-term hope of advancing Alzheimer disease treatments in humans. The study, “Investigating the effect of trazodone, rapamycin, and cannabidiol on cognitive dysfunction in dogs,” is led by principal investigators Stephanie McGrath, DVM, and Julie Moreno, PhD, and the researchers are looking for people who would like to have their dogs evaluated for enrollment in the study.

The researchers state that dementia is a problem for aging humans and dogs alike. As the proportion of older Americans relative to the overall population in the US continues to rise, Alzheimer disease and other forms of dementia are becoming increasingly frequent causes of disability and death. The likelihood of Alzheimer disease increases with age, affecting 5.3% of people between the ages of 65 and 74, rising to 13.8% in 75- to 84-year-olds, and ballooning to 34.6% for those over the age of 85. What’s more, the number of Americans over age 65 is projected to increase from 58 million in 2021 to 88 million by 2050.

One of the challenges to discovering a treatment for Alzheimer disease is identifying a good model for research, which is where canine cognitive dysfunction syndrome

comes in. CCDS is a neurodegenerative disease affecting dogs with many similarities to Alzheimer disease. It affects 14–35% of dogs over the age of eight, and that percentage continues to increase with advancing age, with one study reporting that 68% of dogs 15 to 16 years old are affected. Signs of CCDS include changes in behavior, like disorientation, irritability, changes in sleep cycles, house soiling, and decreased activity.

According to researchers, the disease also has a great deal in common with Alzheimer disease in humans, even at the biological level. The brains of patients with Alzheimer disease classically have deposits of beta-amyloid protein known as plaques, and neurofibrillary tangles marked by hyperphosphorylated tau proteins, observations also made in dogs with CCDS. Dogs typically share a home closely with their humans and are subject to many of the same environmental exposures.

“The discovery of therapeutics for diseases like Alzheimer disease is essential but extremely difficult as we are unable to fully model it appropriately in the basic research laboratory,” Moreno, an assistant professor in the Department of Environmental and Radiological Health Sciences, said. “However, when collaborations like ours exist, we can take findings from a mouse or a worm and apply them to a dog with clinical disease. The advantage of dogs is that they have a naturally occurring form of Alzheimer disease that is similar to the human form.”

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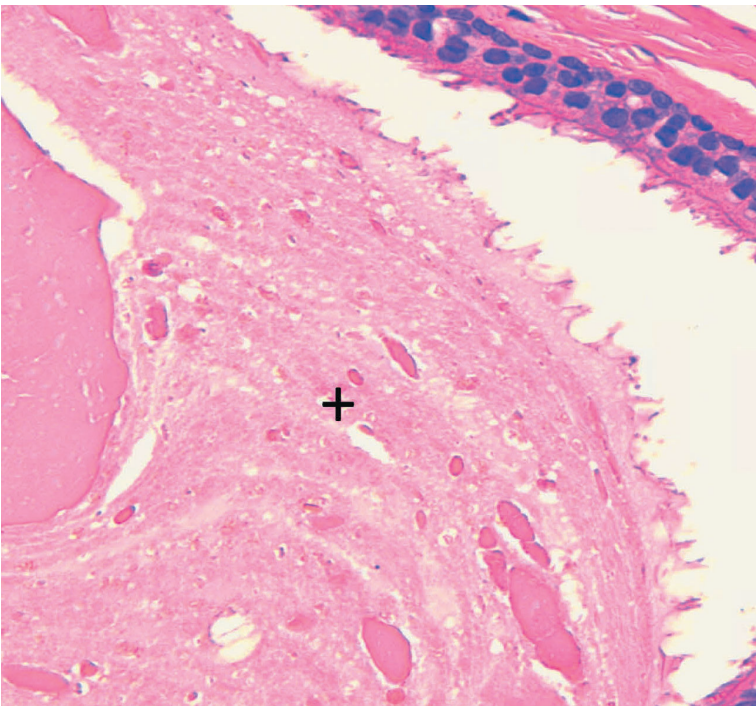
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ABSTRACTS



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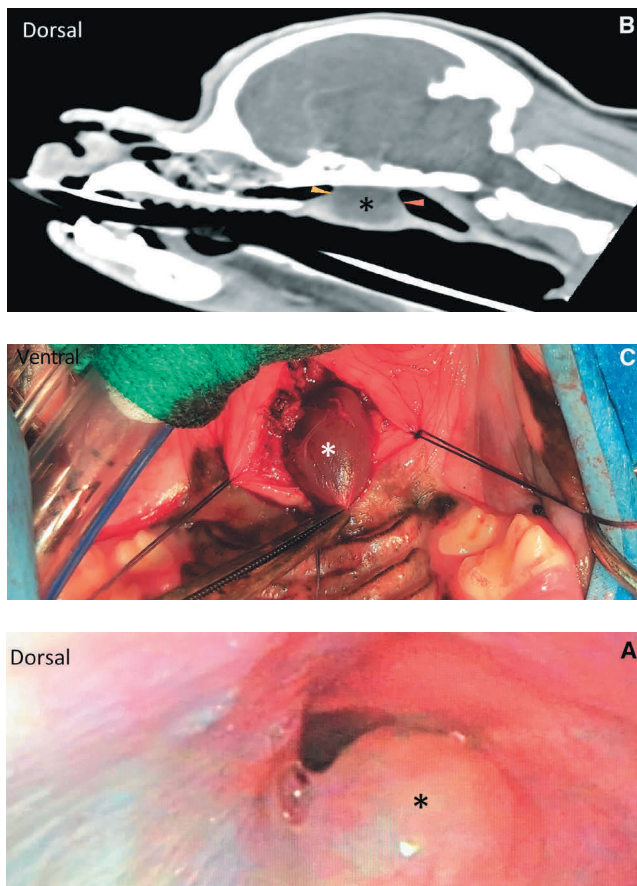
CASE REPORTS

Resolution of Signs of Epiglottic Retroversion Following Medical Management of Hyperadrenocorticism in a Dog

Shota Wada, Kensuke Nakamura

A 6 yr old spayed female Chihuahua was referred for a 10 mo history of chronic respiratory compromise. Decreased serum thyroxine and thyroid-stimulating hormone concentrations had been confirmed at a primary clinic, but no treatment was initiated. Serum biochemistries revealed elevated alkaline phosphatase and cholesterol concentrations. An adrenocorticotrophic hormone-stimulating test revealed elevated pre-serum and post-serum cortisol concentrations. Fluoroscopy revealed marked epiglottic retroversion (ER) during inhalation. Enlarged bilateral adrenal glands were found on abdominal ultrasonography. Based on these findings, ER and hyperadrenocorticism (HAC) were diagnosed and surgical correction of the ER was planned. Trilostane administration was initiated before surgery to reduce the risk of thrombosis due to HAC. Seven days after the initiation of trilostane therapy, clinical signs of chronic respiratory compromise were resolved. The patient had remained clinically stable without recurrence of respiratory compromise for at least 15 mo at the time of this case report. This case suggests that HAC could contribute to the development of clinical signs of ER, which could potentially be successfully controlled by medical treatment of HAC.





CASE REPORTS

Nasopharyngeal Presentation of a Pharyngeal Cleft Cyst in a Dog

Chloé Job, Pierre Maitre, Delphine Rivière, Mélanie Fine, Mathieu Faucher

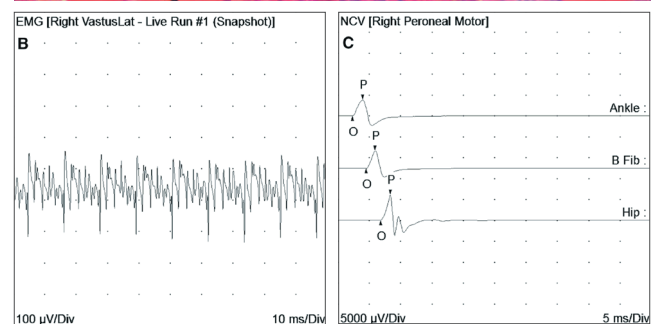
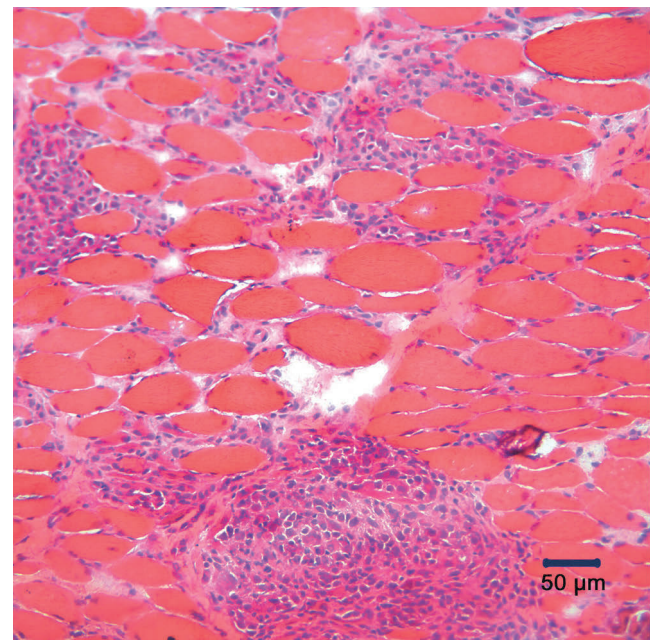
A 2 yr old castrated male shih tzu was presented for assessment of worsening chronic snoring since first detected at 3 mo of age. An upper respiratory endoscopic examination and a computed tomographic scan showed a well-circumscribed, fluid-filled nasopharyngeal mass located in the median plane on the nasal side of the soft palate. This lesion was removed using a ventral approach to the nasopharynx by blunt-sharp dissection from the submucosal tissues of the soft palate. Histopathology revealed a cystic lesion lined by a single layer of a pseudostratified columnar ciliated epithelium, characteristic of a pharyngeal cyst. Follow-up 5 mo after surgery revealed complete resolution of the clinical signs with no evidence of local recurrence. Pharyngeal cysts are developmental abnormalities of the branchial apparatus. Most derive from the second branchial arch and cause cysts, sinuses, and fistulae to develop in the neck region. In our case, the lesion was located in the nasopharynx, leading to snoring and exercise intolerance. This condition should be included in the differential diagnosis of suspected nasopharyngeal obstruction.

CASE REPORTS

Dystrophin-Deficient Muscular Dystrophy in Two Male Juvenile Brittany

Rebecca Stevens, Shinichi Kanazono, Scott Petesch, Ling T. Guo, G. Diane Shelton

A 6 mo old and a 7 mo old male intact Brittany were presented for progressive exercise intolerance, failure to grow, and dysphagia. Creatine kinase activity was markedly and persistently elevated in both dogs. Based on the neurological examination, clinical signs localized to the neuromuscular system. Electromyography revealed complex repetitive discharges in multiple muscle groups. Immunofluorescence of biopsies confirmed dystrophin-deficient muscular dystrophy. This is the first report describing dystrophin-deficient muscular dystrophy in the Brittany breed. Currently, no specific therapies are available for this form of myopathy. The presence of dystrophin deficiency in the two dogs suggests an inherited myopathy rather than a spontaneous mutation. The location of the dogs in the United States and Japan suggests a wide distribution of this dystrophy and should alert clinicians to the existence of this myopathy in the Brittany breed. A mutation in the *DMD* gene has not yet been identified.



RETROSPECTIVE STUDIES

Medicinal Leech Therapy in Veterinary Medicine: A Retrospective Study

Celine S. Kermanian, Nicole J. Buote, Philip J. Bergman

The objective of this study was to report the clinical indications, outcomes, and complications associated with medicinal leech therapy (MLT) in dogs and cats. Medical records (2012–2016) of client-owned dogs ($n = 9$) and cats ($n = 3$) treated with MLT at one institution were retrospectively reviewed. Retrieved data included the signalment, indications, physical examination findings, laboratory results, methods of leeching, outcomes, and complications associated with MLT. Following MLT sessions, nine patients (75%) visibly showed clear improvement of the affected tissue. One patient (8%) was euthanized before complete healing owing to pulmonary parenchymal disease. Improvement or appearance of tissue following MLT was not recorded in two patients (17%). Results suggest that MLT may be a safe and effective treatment modality for venous congestion and necrosis in compromised skin flaps and wounds with success in resolving 75% of the lesions in this study. This study is suggestive of the value of MLT when more conventional treatment methods fail in dogs and cats. A data collection form was created for veterinarians to use with the goal of obtaining standardized, objective MLT data for future studies.

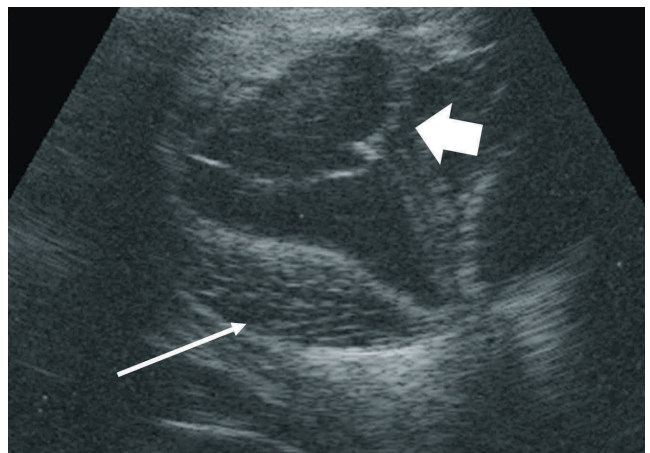


RETROSPECTIVE STUDIES

Ocular Injuries Related to Grooming Visits in Dogs: 161 Cases (2004–2020)

Jessica Chmiel, Stephanie Pumphrey, Elizabeth Rozanski

Owners of dogs with ocular issues often suspect their pet's eye problems are linked to recent grooming visits. A medical records search was performed to identify dogs presenting with ocular complaints initially noted within 24 hr of a commercial grooming appointment. Data collected included signalment, type of injury, treatment, and notations regarding behavioral issues potentially contributing to injury. One hundred sixty-one episodes involving 159 dogs were identified. Male dogs accounted for 57% of episodes. Median age at presentation was 59 mo. Shih tzu were involved in 34% of incidents, and 71% involved small-breed dogs. Aggressive or reactive behaviors were reported in 33% of dogs. Corneal ulceration was the most common injury (71% of incidents), followed by conjunctivitis (11%), eyelid lacerations (7%), and subconjunctival hemorrhage (6%). Surgical management was required in 14% of cases, including four dogs that underwent enucleation. Ocular injury during grooming appointments can occur via several mechanisms including trauma, exposure to grooming products, or inadvertent strangulation. Small-breed dogs, particularly shih tzu, appear to be at increased risk. Reactive or aggressive behavior likely increases risk of ocular injury. Veterinarians can help limit grooming-associated ocular injuries by recommending behavioral or pharmacological interventions before grooming visits.





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CHEWABLES

CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS: For use in dogs to prevent canine heartworm disease by eliminating the tissue stage of heartworm larvae (*Dirofilaria immitis*) for a month (30 days) after infection and for the treatment and control of ascarids (*Toxocara canis*, *Toxascaris leonina*) and hookworms (*Ancylostoma caninum*, *Uncinaria stenocephala*, *Ancylostoma braziliense*).

DOSAGE: HEARTGARD® Plus (ivermectin/pyrantel) should be administered orally at monthly intervals at the recommended minimum dose level of 6 mcg of ivermectin per kilogram (2.72 mcg/lb) and 5 mg of pyrantel (as pamoate salt) per kg (2.27 mg/lb) of body weight. The recommended dosing schedule for prevention of canine heartworm disease and for the treatment and control of ascarids and hookworms is as follows:

Dog Weight	Chewables Per Month	Ivermectin Content	Pyrantel Content	Color Coding On Foil Backing and Carton
Up to 25 lb	1	68 mcg	57 mg	Blue
26 to 50 lb	1	136 mcg	114 mg	Green
51 to 100 lb	1	272 mcg	227 mg	Brown

HEARTGARD Plus is recommended for dogs 6 weeks of age and older. For dogs over 100 lb use the appropriate combination of these chewables.

ADMINISTRATION: Remove only one chewable at a time from the foil-backed blister card. Return the card with the remaining chewables to its box to protect the product from light. Because most dogs find HEARTGARD Plus palatable, the product can be offered to the dog by hand. Alternatively, it may be added intact to a small amount of dog food. The chewable should be administered in a manner that encourages the dog to chew, rather than to swallow without chewing. Chewables may be broken into pieces and fed to dogs that normally swallow treats whole.

Care should be taken that the dog consumes the complete dose, and treated animals should be observed for a few minutes after administration to ensure that part of the dose is not lost or rejected. If it is suspected that any of the dose has been lost, redosing is recommended.

HEARTGARD Plus should be given at monthly intervals during the period of the year when mosquitoes (vectors), potentially carrying infective heartworm larvae, are active. The initial dose must be given within a month (30 days) after the dog's first exposure to mosquitoes. The final dose must be given within a month (30 days) after the dog's last exposure to mosquitoes.

When replacing another heartworm preventive product in a heartworm disease preventive program, the first dose of HEARTGARD Plus must be given within a month (30 days) of the last dose of the former medication.

If the interval between doses exceeds a month (30 days), the efficacy of ivermectin can be reduced. Therefore, for optimal performance, the chewable must be given once a month on or about the same day of the month. If treatment is delayed, whether by a few days or many, immediate treatment with HEARTGARD Plus and resumption of the recommended dosing regimen will minimize the opportunity for the development of adult heartworms.

Monthly treatment with HEARTGARD Plus also provides effective treatment and control of ascarids (*T. canis*, *T. leonina*) and hookworms (*A. caninum*, *U. stenocephala*, *A. braziliense*). Clients should be advised of measures to be taken to prevent reinfection with intestinal parasites.

EFFICACY: HEARTGARD Plus Chewables, given orally using the recommended dose and regimen, are effective against the tissue larval stage of *D. immitis* for a month (30 days) after infection and, as a result, prevent the development of the adult stage. HEARTGARD Plus Chewables are also effective against canine ascarids (*T. canis*, *T. leonina*) and hookworms (*A. caninum*, *U. stenocephala*, *A. braziliense*).

ACCEPTABILITY: In acceptability and field trials, HEARTGARD Plus was shown to be an acceptable oral dosage form that was consumed at first offering by the majority of dogs.

PRECAUTIONS: All dogs should be tested for existing heartworm infection before starting treatment with HEARTGARD Plus which is not effective against adult *D. immitis*. Infected dogs must be treated to remove adult heartworms and microfilariae before initiating a program with HEARTGARD Plus.

While some microfilariae may be killed by the ivermectin in HEARTGARD Plus at the recommended dose level, HEARTGARD Plus is not effective for microfilariae clearance. A mild hypersensitivity-type reaction, presumably due to dead or dying microfilariae and particularly involving a transient diarrhea, has been observed in clinical trials with ivermectin alone after treatment of some dogs that have circulating microfilariae.

Keep this and all drugs out of the reach of children.

In case of ingestion by humans, clients should be advised to contact a physician immediately. Physicians may contact a Poison Control Center for advice concerning cases of ingestion by humans.

Store between 68°F - 77°F (20°C - 25°C). Excursions between 59°F - 86°F (15°C - 30°C) are permitted. Protect product from light.

ADVERSE REACTIONS: In clinical field trials with HEARTGARD Plus, vomiting or diarrhea within 24 hours of dosing was rarely observed (1.1% of administered doses). The following adverse reactions have been reported following the use of HEARTGARD: Depression/lethargy, vomiting, anorexia, diarrhea, mydriasis, ataxia, staggering, convulsions and hypersalivation.

To report suspected adverse drug events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or online at www.fda.gov/reportanimalae

SAFETY: HEARTGARD Plus has been shown to be bioequivalent to HEARTGARD, with respect to the bioavailability of ivermectin. The dose regimens of HEARTGARD Plus and HEARTGARD are the same with regard to ivermectin (6 mcg/kg). Studies with ivermectin indicate that certain dogs of the Collie breed are more sensitive to the effects of ivermectin administered at elevated dose levels (more than 16 times the target use level) than dogs of other breeds. At elevated doses, sensitive dogs showed adverse reactions which included mydriasis, depression, ataxia, tremors, drooling, paresis, recumbency, excitability, stupor, coma and death. HEARTGARD demonstrated no signs of toxicity at 10 times the recommended dose (60 mcg/kg) in sensitive Collies. Results of these trials and bioequivalency studies, support the safety of HEARTGARD products in dogs, including Collies, when used as recommended.

HEARTGARD Plus has shown a wide margin of safety at the recommended dose level in dogs, including pregnant or breeding bitches, stud dogs and puppies aged 6 or more weeks. In clinical trials, many commonly used flea collars, dips, shampoos, anthelmintics, antibiotics, vaccines and steroid preparations have been administered with HEARTGARD Plus in a heartworm disease prevention program.

In one trial, where some pups had parvovirus, there was a marginal reduction in efficacy against intestinal nematodes, possibly due to a change in intestinal transit time.

HOW SUPPLIED: HEARTGARD Plus is available in three dosage strengths (See DOSAGE section) for dogs of different weights. Each strength comes in convenient cartons of 1, 6 and 12 chewables.

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¹ Data on file at Boehringer Ingelheim. ² Data on file at Boehringer Ingelheim. ³ Ascarid for Dog. Companion Animal Parasite Council. <https://capcvet.org/guidelines/ascarid/>. Accessed December 2, 2020. ⁴ Hookworms for Dog. Companion Animal Parasite Council. <https://capcvet.org/guidelines/hookworms/>. Accessed December 2, 2020.

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Customized Care for Seniors

Senior Pets Deserve Individualized Care Plans

by Mary Gardner, DVM

I WAS STUNNED! I was expecting to see a vein specialist at my two-week recheck after having learned I had a blood clot in my calf. I was concerned, I had questions, and I wanted to talk to a doctor. But the nurse simply told me, “Don’t worry, these clots are so common. You’re basically on the conveyor belt of care unless something different happens.” I nearly blurted out: “WHAT? *Conveyor Belt of Care?!*”

I realize that most physicians are evermore pressured by financial constraints and administrative burdens imposed by various components of the US healthcare system, but I had never felt more like a number at a doctor’s office. Immediately afterward, I scheduled a visit at a different clinic.

Context Matters

Just because a medical condition is common or may be a predictable issue by the time we reach a certain age doesn’t mean we don’t need individualized patient care. Veterinary teams can easily play a “name-that-disease by species/breed/age” trivia game: Middle-age golden retriever? Cancer. Senior Doberman pinscher? Dilated cardiomyopathy. Greying Labrador retriever? Osteoarthritis. Skinny geriatric cat? Chronic kidney disease.

But this kind of “cookbook” approach to care is unlikely to consistently produce five-star patient outcomes. Of course it’s essential to follow veterinary practice guidelines, policies, consensus statements, and checklists created by our professional associations, institutions, and societies to help us standardize best practices for patient care. But fine-tuning each “recipe” serves our patients and clients well, and it relies on context.

Each condition is a new problem for each pet and the families who love them. It’s a new issue to manage, a new fear to face, and possibly a reason to say goodbye. The context—various circumstances relevant to each pet’s and pet owner’s situation—influences our ability to provide good, individualized patient care. We must also avoid judging a pet owner’s decisions about their pet’s care.

When helping a senior pet, I consider several factors that provide context for each pet’s story: the pet’s ailments, the pet’s personality, and the pet owner’s four budgets: financial, physical, time, and emotional.

The Pet’s Ailments

A senior pet usually has multiple ailments. A wobbly geriatric cat with arthritis may be presented for evaluation of vomiting, but she may also have decreased vision, house-soiling, lack of self-grooming, cognitive impairment, and anxiety. I evaluate every pet holistically and address the pet’s issues in accord with the owner’s abilities. I ask the owner, “What are the two most pressing problems you’re facing with your pet right now?”

So even when my examination reveals that a dog has mild dental disease and is long overdue for a professional dental cleaning, if the owner tells me their dog pants and paces all night and family members are losing sleep, I know we should address that issue first. A dog’s sparkling clean teeth may not stop the family from euthanizing him if he still can’t settle down at night.

The Pet’s Personality

Next, I consider how the pet is handling their ailments and the necessary treatments and environmental adjustments.

For example, an elderly cat with chronic kidney disease may sit quietly on his owner’s lap for daily subcutaneous fluid therapy and chin scratches. But if the owner tells me the cat becomes Satan’s spawn when they try to give him oral medications, I know I’ll need to prescribe a transdermal appetite stimulant when the time comes. Otherwise, the cat will stop getting his oral medication, not consume enough calories, and may develop caregiver aversion—so even the fluid therapy sessions could become a battle. I’ll also begin to talk with the owner about a variety of options to disguise and give oral medications, because giving an oral drug at some point may become unavoidable.

Or a fearful, anxious dog with mobility issues who snaps at every stranger who approaches him will probably need his owner to video chat with a veterinary rehabilitation specialist so he can do his exercises at home.

The Pet Owner's Four Budgets

I've found that evaluating each of these pet owner budgets is crucial in ensuring a senior pet's optimal care.

Financial. We all know that the amount each pet owner can or will spend for their pet's healthcare varies widely. An owner may struggle to pay \$100 once a year for an examination and rabies vaccination and another may not bat an eye at paying \$1,000 a month for a veterinary therapeutic diet and cancer treatments. Some owners have extremely limited finances while others would sell their house for their pet's care. It's important to refrain from judgment as you're constructing a patient's care plan.

Physical. Consider how well an owner can physically manage their pet. A large dog with mobility issues whose owner can't lift her in and out of the car to get to their three-times-a-week rehabilitation therapy appointments may jump at the chance to train their dog to use a ramp. A simple suggestion can make the dog's car trips to medical appointments feasible, and it may also mean that those joyful rides to spend Sunday afternoons at the beach won't stop.

I once helped a 50-year-old client who had a 20-pound Shetland sheepdog with osteoarthritis. Because the owner had rheumatoid arthritis, she struggled to bend down, pick up her wee dog, and traverse the two porch steps to help her



My girl Sam had spinal lymphoma and needed an elevated bowl to eat, a yoga mat to stand on, a peanut exercise ball to help support her hind end, and a harness. Having pictures on your website as examples of what a family can do will help them envision the possibilities.

dog get outside to eliminate. I helped her find a sturdy dog mobility harness with a long strap, and that made walks easier for them both.

For various reasons, many older dogs and cats can't make it to the veterinary clinic as easily as they used to, so consider offering telemedicine or mobile services when possible.

Time. Senior pets take time! They walk slower, eliminate more often, receive multiple medications, need extra rest time, require special attention to comfort care, and need more frequent veterinary visits—the list can be long. A healthy four-year-old dog may stay home alone comfortably for nine hours, receive parasite preventives once a month,

Seek Out Senior Pets

A study I did with VetSuccess showed that 50% of US pets euthanized at their veterinary clinic had not visited their veterinarian in more than 12 months before they were presented for euthanasia. This breaks my heart because we can give families and pets so much help to ease a pet's ailments and improve their quality of life and sustain a family's bond with their pet. A pet owner may simply think, "Rusty is just old, what will Dr. Gardner say that will help?" I can listen, and I can say a lot!

Veterinary practices need to attract clients who have senior pets just as much as, if not more than, they focus on attracting puppy and kitten owners. And reaching owners of senior pets means saying more on our websites and social media than, "Senior pets need biannual blood tests and X-rays so we can uncover your pet's lurking problems." (That sounds kind of scary, right?)

Instead, provide senior-pet specific education and practical tips that allow pet owners to bolster their senior pets' wellbeing and maintain their daily joys of living. This approach will drive more traffic to your website, spark delighted shares of your social media posts, and open more doors into your practice. Show pet owners you know how to help them provide excellent care for their weak and wobbly, crusty and bumpy, most amazing senior pets!

and need to see a veterinarian only once a year. A senior dog may house-soil if she can't get outside every four hours, need medications every six hours, and have veterinary evaluations and rechecks four or more times a year.

Pet owners who have work, travel, or other family commitments may be unable to devote adequate time to their senior pet's care. Assessing an owner's needs for different medication options or long-acting formulations (or perhaps decreasing the number of medications or supplements if feasible); recommending reliable pet sitters; and offering telemedicine services, specialized boarding, or even handy cleaning and hygiene tips can be invaluable.

Emotional. Caregiving for a senior pet may have an owner struggling to stay afloat in a sea of emotions: distress, anxiety, fear, sadness, frustration, guilt, or even disgust. Owners of geriatric pets may also be experiencing anticipatory grief when they know their remaining time with their ailing pet is short.

We can help replenish an owner's emotional budget by carefully explaining the pet's ailments and what the owner can expect from treatments, providing supplemental educational resources, making specific product recommendations to ease a pet's activities of daily living, encouraging owners to thoughtfully consider their goals of care for their pet and share them with you, and identifying local resources to help simplify their caregiving.

Closing Thoughts

I hope the veterinary profession can avoid a “conveyor belt of care” system, and that veterinary caregivers will dodge that mindset. As a hospice veterinarian, I have seen my fair share of senior and geriatric pets. Every patient has a unique story and set of circumstances, and every owner has a unique set of goals for their pet's care. I approach every patient with a fresh perspective and open mind. Over the years I have been amazed at what families have done for their senior pets, and I'm grateful to have learned so much from the families I have helped. ❄



Mary Gardner, DVM, is cofounder of Lap of Love Veterinary Hospice, coeditor of a veterinary textbook *Treatment and Care of the Geriatric Veterinary Patient*, and author of new books for pet parents, including *It's Never Long Enough—A Practical Guide to Caring for Your Geriatric Dog*, *Geriatric Dog Health & Care Journal*, and *Geriatric Cat Health & Care Journal*. Gardner's latest book, *Nine Lives Are Not Enough—A Practical Guide to Caring for Your Geriatric Cat*, is set to be published in November 2022.

Help Create Senior Pet-Friendly Homes

Veterinarians can easily recommend the best diagnostic tools, medications, and complementary therapies, but we often struggle with how to help a family meet a senior pet's environmental needs at home. Ask clients to take pictures and short videos of where their pet sleeps, eats, plays, and eliminates. Ask clients about other pets and children in the home and what the family struggles with the most. Maybe their cat can't jump into their daughter's bed anymore and she misses that snuggle time, but a simple ramp and a nightlight can preserve that bond. Maybe a family needs to set up a safe zone when they leave for the day to protect their cognitively impaired dog from getting stuck under furniture.

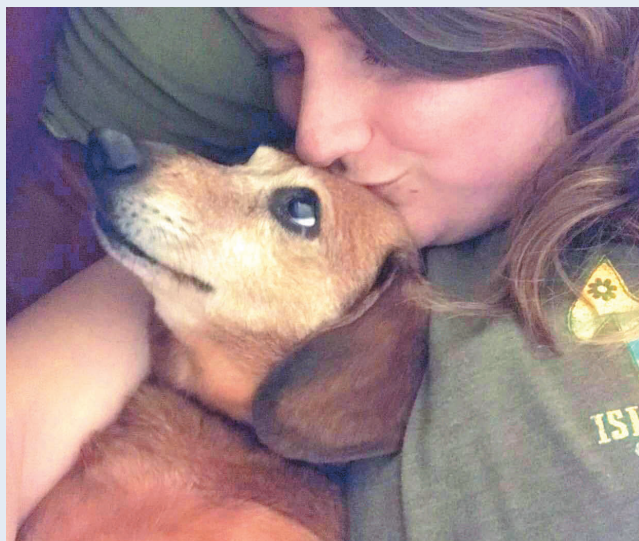
Keep a wealth of product suggestions and home hacks handy that relate to the various ailments a senior dog or cat may have. Here's a short list of the types of products and services I suggest that every practice research and have ready to recommend to clients who have senior pets:

- Mobility harnesses
- Booties
- Low-entry litter boxes
- Pheromone products
- Yoga mats and other options for nonslip flooring
- Halos for visually impaired pets
- Cleaning products
- Pet diapers
- Soothing sound machines or pet music resources
- Pet ramps and stairs
- Cameras to keep an eye out while the pet is home alone
- Delectable treats and food flavor enhancers
- Supplemental heat sources
- Orthopedic beds
- Food puzzles
- Pet groomers
- Pet sitters

Senior Moments

Personal Stories of Older Pets from the AAHA Community

AAHA staff and members shared stories of their senior pets in the AAHA Community. See these and other great posts at community.aaha.org.



Tipsy's Long Adventure

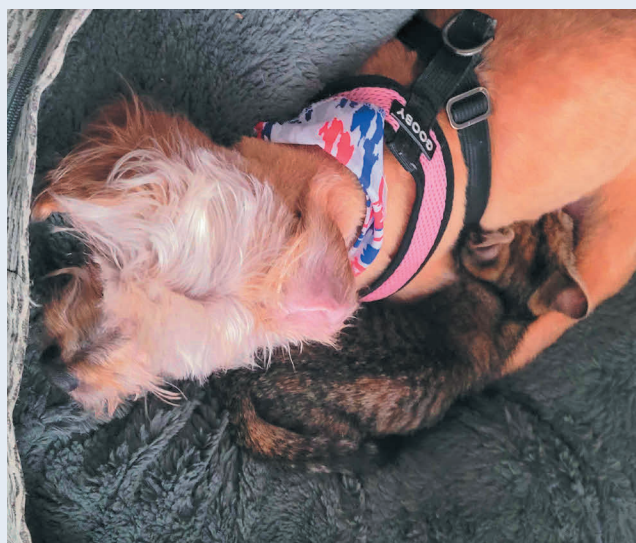
Tipsy's story began the day of my grandfather's celebration of life in 2007. That was the day my parents gave me Tipsy. She was an 8-week-old dachshund and cute as could be. I immediately fell in love with her. I named her "Tipsy" as a way to honor my grandfather who suffered with alcohol addiction.

Tipsy and I went through everything together. She was with me at the end of high school, she went through college with me, and of course, through many life changes. It was always Tipsy and me against the world! She was the love of my life and my first baby. Coming home to her always made bad days better. She had a personality that wouldn't quit. She was such a sweet girl.

She made it to the prime age of 14, just four months shy of her 15th birthday. Two years prior to that she was diagnosed with heart disease. I followed through with medications and veterinary visits for those 2 years. Despite our best efforts and her dynamite personality, she eventually developed congestive heart failure. There was nothing I could do to fix it. I kept her as comfortable as I could for as long as I could. She was loved and cared for until the end. In my heart, I know she understood I loved her. Saying goodbye

to a senior pet is heartbreaking, but the experience of caretaking, giving unconditional love and compassion, made the effort all worth it.

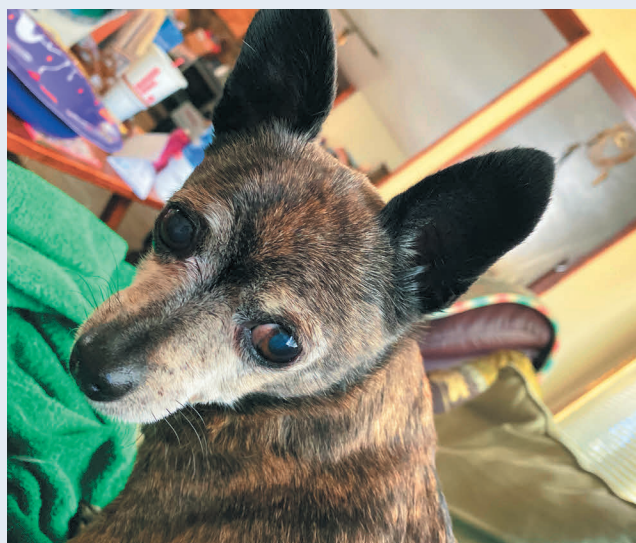
—Kati Nelson, AAHA Accreditation Specialist



Angel on Earth

Angel was an amazing kitten wrangler and loved our foster kittens. She would often groom them and let them (attempt to) nurse on her. She let them eat from her bowl without fussing. And she always had lots of cuddles for them.

—Victoria Owens, via Danielle Pitre Richard,
Nursing Manager, Lafayette Veterinary Care Center



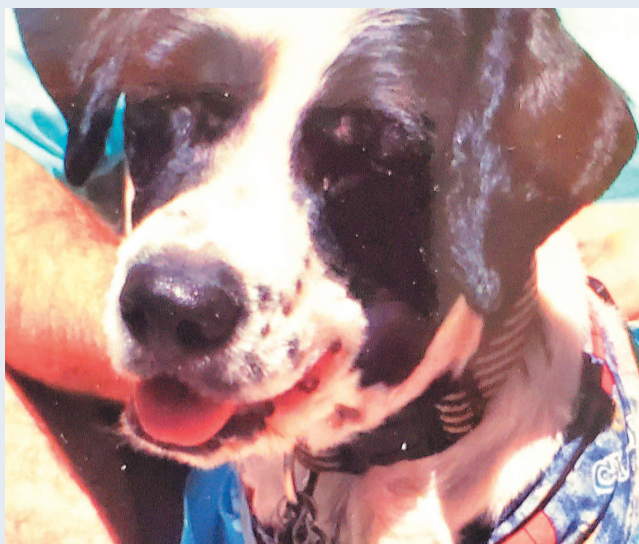
Zoomie Memories

I have a 16-year-old Chihuahua, Mo, that has a few medical issues, severely collapsing trachea, chronic cough, and has

started to lose his sight. This little dog has been a part of our household for 14 years and is the last of four seniors we have had as part of our family.

He has some horrible days when he doesn't want to eat or take his meds, but some days he gets the zoomies and has us all laughing out loud. Senior pets can be a lot of work, but they usually have been with us for so many years that we couldn't picture life without them. It will be hard to say goodbye when the time comes but we will remember the zoomie days and those memories will last a lifetime.

—Aimee Potter, AAHA Accreditation Specialist



Tucker, Adventure Dog

It seems an irony to me that what can be one of the most heartbreaking moments in life can simultaneously be one of its most compassionate and loving as well. I am also blessed to have shared life with several senior dogs and although the dynamics of the relationship change our love and care do not.

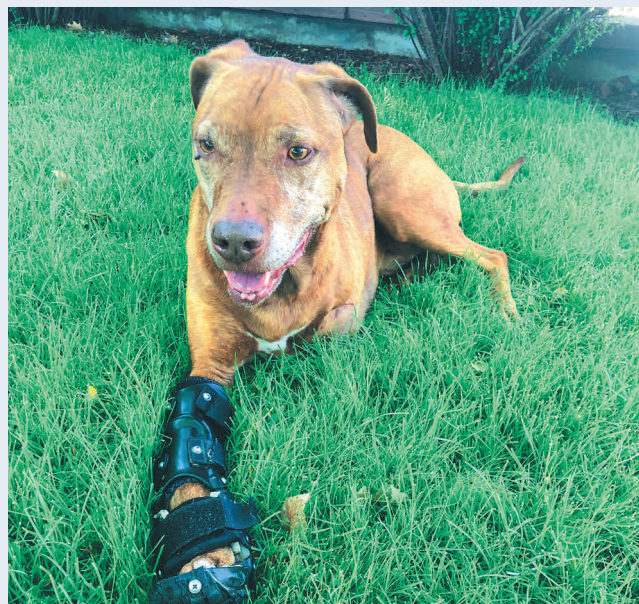
I will never forget the day I was sitting across the room from my sweet boy Tucker and noticed, for the first time, the gray strands that seemed to spring up overnight on his face. At first, I could not believe it. It seemed just yesterday he was the mischievous puppy I brought home at just 10 weeks old.

He was such a confident, adventurous pup and a perfect traveler and copilot. We lived in several states, and he enjoyed them all. From surfing in Hawaii to snowmobiling and hiking in Colorado, he lived every moment, in the moment. Even when we were just curled up on the couch for movie night, he was content.

As he reached his senior years, his cognitive function gradually declined, and his body soon followed. It was hard to watch my once energetic pup slow down, but he continued to live every day as best he could. Instead of a hike in the mountains, the daily walk down the driveway to get the mail was a highlight of his day. My dogs have taught me so much about living life and I do my best to emulate that sense of perspective and stop obsessing about the past and worrying about the future.

When it was time to say goodbye, my heart was full, and my only hope was that he felt the same. Tucker lived to be 17, and I am so truly thankful he shared those years with me.

—Karen Loggins, AAHA Practice Consultant



The Art of Laying Down

As Jem has gotten older, and grey-er, he's definitely mastered the art of laying down. We used to walk about .6 miles a day together. His front leg is deformed, and it took him a while. With his brace on, he could go at a decent clip and we'd make it in about 20 minutes. Now, with arthritis and the wisdom of age, we go about half that distance and it takes about 40 minutes. There's a LOT of laying down in the grass along the way disguised as sniffing, then rolling around, then just laying there. The hotter it gets, the better the grass looks at each stop. His record is 22 stops in a 4-block stretch. When the Rimadyl kicks in, he can go 6 blocks in 30 minutes and stop less than 10 times!.

—Garth Jordan, AAHA CEO



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- In-clinic + Vet Home Delivery Offer
- Landing Page



2022 AAHA Canine Vaccination Guidelines



Guidelines

These guidelines are generously supported by Boehringer Ingelheim Animal Health, Merck Animal Health, Zoetis Petcare, and Elanco Animal Health.

What's Core for You?

Create personalized vaccination plans to minimize risk and optimize health.

Vaccination plans don't look the same for every dog. These guidelines empower veterinarians to make the best possible personalized recommendations. For every patient, ask "what's core for this patient?"



Core means the vaccines required for ALL dogs PLUS vaccines required based on the individual patient's lifestyle and risk factors.



All dogs should have the following **core** vaccines: Distemper, Adenovirus, Parvovirus, Parainfluenza, and Rabies.



Other vaccines are **essential for some dogs based on their lifestyle and risk**, including Leptospira, Lyme disease, Bordetella, canine influenza, and rattlesnake toxoid.



When vaccines are overdue or unknown, the benefits of vaccinating outweigh the risks in most cases. **When in doubt, vaccinate.**



Vaccines are important to keep dogs healthy and protected from infectious diseases, including some that can be spread from dogs to people.



Train your team to talk to clients about vaccines and why they are a vital part of their dog's health plan.

Meet
Clark!



aaha.org/canine-vaccinations

Striving for Success

Tips to Start New Diabetic Pets and Owners Off Right

by Kate Boatright, VMD

RECEIVING A DIAGNOSIS OF DIABETES MELLITUS can be overwhelming for a pet owner. Extensive client education is needed once the diagnosis is made. Discussion points should include the feasibility of treatment, finances, prognosis, the treatment plan itself, and monitoring. Having a clear communication plan is essential to ensure that clients feel prepared for treatment and that it is as minimally stressful for both client and patient as possible.

Barriers to Treatment

Owners must consider many factors before committing to the lifelong treatment of a diabetic pet. It is the veterinarian's responsibility to have candid, comprehensive conversations with their clients to determine if treatment is the right choice for each individual pet and family.

These conversations can be especially important for owners of pets presenting in diabetic ketoacidosis. In the moment of an emergency, it can be tempting to focus on getting the pet through the initial crisis, but owners must be aware that hospitalization is only the beginning. Including information about long-term management of the disease is essential in these cases to properly guide owners in their decision whether or not to treat.

From a financial perspective, both initial and long-term costs should be considered. In patients diagnosed with





“Beyond the financial investment, managing a diabetic pet requires a lifestyle commitment as a chronic caretaker.”

—HEATHER KVITKO-WHITE, DVM, DACVIM

uncomplicated diabetes mellitus, the initial financial investment can be hundreds of dollars depending on the type of insulin, diet changes, initial diagnostics, and frequency of monitoring. For patients requiring treatment of concurrent disease, such as pancreatitis, or who present in diabetic ketoacidosis, pet owners may invest thousands of dollars in diagnostics and treatment in a matter of days.

Long-term costs include treatment of the primary disease, monitoring, and diagnosis and treatment of potential complications that can arise for diabetic patients. “Diabetes is a lifelong diagnosis which can hardly be made cheap,” said Heather Kvitko-White, DVM, DACVIM. “It is important that practitioners do not overextend clients’ initial funds on diagnostics that may not change treatment and to be aware that continued cost and unanticipated expenses are inevitable over the course of the pet’s lifetime.”

“Beyond the financial investment, managing a diabetic pet requires a lifestyle commitment as a chronic caretaker,” continued Kvitko-White. This commitment includes administering insulin injections twice daily, controlling diet, close monitoring, and attending many follow-up appointments. While this commitment has the potential to strengthen the human-animal bond between owner and pet, difficulties in treatment due to both owner and pet factors also have the potential to be detrimental to this bond.

Insulin injections can cause fear in both owner and pet.

According to Apketmann et al. (2014), over half of owners reported being fearful of administering injections at the beginning of treatment, but most were able to overcome this fear. Teaching owners that most pets tolerate insulin injections well and that they are relatively easy to administer is an important part of preparing owners for treatment.

See how one pet owner overcame her fear of needles in the podcast transcript, on page 57!

Despite our best efforts though, some pets are simply not amenable to injections. A pet that begins hiding from their owner or biting when medicated will have a detrimental effect on the quality of life of both the pet and the owner, and patient temperament should be considered when electing to pursue treatment.

For some clients, work or travel schedules make regular insulin injections challenging, especially for a pet owner who lives alone. Many studies have reported that the need to find appropriate boarding or pet sitting services for diabetic pets when traveling is considered a major stressor for diabetic pet owners. For owners who travel frequently, this may be the factor that makes treatment impossible.

All of these factors should be discussed with the client before treatment is pursued. Diabetic treatment is not for everyone, and clients should hear this from their veterinarian. “Pet owners should never be made to feel

bad for euthanizing a diabetic pet,” said Kvitko-White. In fact, beginning treatment that is not sustainable may be more detrimental for the physical, mental, and financial health of both pet and owner than to elect humane euthanasia without treatment.

Insulin Considerations

One of the first decisions the veterinarian needs to make once treatment is elected is which insulin product to prescribe. “Diabetes [requires] insulin forever, especially in dogs. Even though it might go into a non-insulin-dependent state, insulin therapy is required in addition to diet, even in cats with type 2 diabetes,” said Kvitko-White. Insulin selection will impact diabetic control and the overall finances of treatment.

Considerations for insulin selection should include the duration of action, anticipated efficacy, and cost. The *2018 AAHA Diabetes Management Guidelines for Dogs and Cats* offer a summary of available insulin products, both the FDA-approved veterinary products and human products. “In general, I prefer to start with Vetsulin for small and medium dogs, glargine for cats, and detemir for large- and giant-breed dogs,” said Kvitko-White. “This is based both on the anticipated length and efficacy of insulin effect but also cost-conscientiously based on a cost-per-unit basis.” Veterinarians should evaluate insulin costs based on the price per unit of insulin instead of price per vial to determine the best value for the client. However, choosing a less efficacious insulin because of the price may, in the long run, cost the owner more owing to poor diabetic control.

Once an insulin is selected, owners must be carefully educated on insulin storage, handling, and administration. Kvitko-White reminds veterinarians that insulin vials often need to be disposed of before the vial is empty, which is an important detail to stress to pet owners. In cases of tight finances, owners may be tempted to stretch their insulin vials longer, which can result in decreased efficacy and, ultimately, higher potential for complications due to poor glycemic control.

Owners should also be advised that there are different types of insulin syringes and shown how to identify the correct syringe for use with their pet’s insulin product. If an owner is sent to a community pharmacy to purchase a human insulin product, be very clear with the owner

about cost expectations. Owners who are shocked by the cost of insulin glargine or insulin detemir upon arriving at the pharmacy may be told about NPH insulin that is available over the counter by a well-meaning pharmacist who lacks the species-specific veterinary knowledge to know the reasoning behind the veterinarian’s insulin choice. If the owner purchases a different insulin than what was prescribed, diabetic control and dosing can be affected.

Teaching owners how to properly care for a diabetic pet can be a time-consuming conversation. It should include both demonstration of insulin administration and supervised practice for the owner on drawing up and administering insulin. These conversations and demonstrations are excellent opportunities for veterinary technicians to use their skills and knowledge. Utilizing veterinary team members to introduce owners to insulin administration ensures that these crucial conversations are not rushed because of pressure on the veterinarian to see other patients.



Once an insulin is selected, owners must be carefully educated on insulin storage, handling, and administration.

Owing to the large amount of information that owners are presented with in a short period of time, it can be helpful to provide them with trusted resources on insulin handling, administration, and storage. Even with detailed verbal instructions and a thorough demonstration of insulin administration, owners are unlikely to retain the large volume of information. The AAHA Diabetic Resource Center (aaha.org/aaha-guidelines/diabetes-management/resource-center) includes a customizable discharge template for new diabetic pets as well as handouts and videos for pet owners on insulin administration and home monitoring.

Dietary Management

Another crucial factor in achieving diabetic control and minimizing complications is appropriate diet. Clients may be hesitant to change their pet's diet, but educating them on the role of diet in achieving glycemic control may help to improve compliance. Compliance with dietary changes can be very high, as 80% of dog owners and 93% of cat owners changed their pet's diet after diagnosis, according to Aptekmann et al. (2014).

Dietary changes are a necessity in feline diabetic patients. High-protein diets are used to limit carbohydrates,

improve satiety, and aid in weight loss without lean muscle mass loss. Combining this diet with twice-daily insulin injections improves the chances of remission. Canned diets can be especially beneficial for diabetic cats owing to the lower caloric density and higher water content.

“In dogs, the most important diet change is to immediately stop feeding any table snacks and treats, most especially those high in fat or salt, which may predispose these dogs to pancreatitis and the potentially significant complications associated with that,” said Kvitko-White. High-fiber diets help control glycemic control; however, many high-fiber diets are too low in protein to support weight loss in overweight cats. High-fiber diets may aid in weight loss and glycemic control in dogs.

For both species, meal feeding is preferred. This allows owners to more easily control caloric intake and ensure the pet is eating prior to receiving insulin treatments. For pets that have been free-fed for their entire lives, a transition to meal feeding may be difficult. In these cases, feeding several small meals throughout the day, as long as they are consistent in amount and time provided, may be a suitable



Teaching owners how to properly care for a diabetic pet can be a time-consuming conversation.

alternative. This same feeding strategy is preferred for cats with type 2 diabetes on synthetic long-acting insulin, as they do not need to eat at the time insulin is administered.

“While prescription diabetic diets are available, they may not be the best choice for an individual pet, regardless of species,” shared Kvitko-White. Instead, the individual goals of treatment, patient preferences, cost of diet, and comorbidities should be considered.

Monitoring Plan

When diagnosing a new diabetic, giving clients an overview of the monitoring plan can help to prepare them for the future. Successful monitoring of diabetic patients requires partnership between the owner and the veterinary team. Owners should be advised of the importance of two-way communication with the veterinary team. Monitoring food and water intake as well as urine output at home are essential because control of clinical signs is one important goal of treatment. However, blood glucose levels must also be monitored, making compliance with follow-up visits critical to achieving diabetic control.

Many strategies for diabetic monitoring exist, and plans can be individualized for specific pets and owners. However, Kvitko-White cautioned, “Diabetes cannot be monitored on the basis of spot blood glucose checks and/or urine checks alone. Blood glucose curves are an essential component to monitoring insulin efficacy and duration.”

In-clinic glucose curves have been critiqued by some for being costly, time-consuming, inaccurate if normal feeding and exercise routines are not followed, and, in cats, easily affected by the stress level in the veterinary hospital. At-home glucose curves may actually be more ideal. Kvitko-White feels that “one of the most cost-conscious approaches to managing diabetic pets is to teach clients to perform blood glucose monitoring at home.” Newer techniques for monitoring blood glucose levels using continuous glucose monitoring systems have shown promising results for both dogs and cats.

Preparation for Complications and Sequelae of Treatment

Potential complications of treatment should be discussed with owners, including risks and clinical signs of



hypoglycemia. Clients should be given instructions for how to dose insulin when their pet is not eating well or vomiting. Information on when and where to seek emergency attention is also important.

Finally, pet owners should be advised of diabetic sequelae and concurrent diseases that may be observed in diabetic pets, including pancreatitis, urinary tract infections, peripheral neuropathy, and ocular changes. For dog owners, one of the most important changes to prepare owners for are ocular changes, as this can have a large impact on quality of life. “Greater than 90% of dogs develop cataracts within the first year,” said Kvitko-White. “Without management, [they] are at risk for lifelong painful uveitis, ulcers, and glaucoma.”

Setting Up for Success

While diabetes can be a frustrating and expensive disease to treat, most clients report good outcomes with treatment according to a 2014 JAAHA study. Additionally, the majority of owners treating a diabetic pet felt that diabetes treatments did not interfere significantly with their daily life, and they were more attached to their pet after beginning treatment, showing that treatment can be rewarding. Taking the time to have comprehensive conversations with owners of newly diagnosed diabetic pets can help to maximize success of treatment and minimize stresses for pet, owner, and veterinary team. ✱



Kate Boatright, VMD, has been in small animal practice since graduating from the University of Pennsylvania in 2013. After nearly eight years of full-time practice in both general practice and emergency clinics, she moved to part-time clinical work to pursue her passion for educating veterinary professionals as a freelance speaker and author. She believes deeply in the role of organized veterinary medicine and holds leadership positions in the AVMA and PVMA. In her remaining time, she stays busy chasing her toddler, running, reading, and watching movies with her husband and cats.

Every animal deserves to be treated using
quality equipment, regardless of where
they are located in the world.

Many veterinarians who work at non-profit organizations cannot access the
veterinary equipment, technology, and supplies that they need.



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What Is Photobiomodulation Therapy?

Some Tips and Considerations

by Ingrid Taylor, DVM

Therapeutic laser therapy is becoming an increasingly available option that veterinary practices can offer their patients. It has many beneficial uses in veterinary patients, including providing analgesia as part of a multimodal pain management plan, promoting wound healing, and reducing inflammation. With the proper training, it is a relatively easy and noninvasive therapy that can be added to a number of treatment protocols.

The therapeutic lasers most commonly used in clinical practice work via a process called photobiomodulation—previously known as low-level light/laser therapy (LLLT). Photobiomodulation therapy (PBMT) uses nonionizing light sources in the visible and infrared spectrum, including lasers, LEDs, and broadband light.

Although the term “photobiomodulation” was first proposed in a publication in 1997, it was more widely adopted only recently, and is often still used interchangeably with LLLT. In 2014, the North American Association for Light Therapy and the World Association for Laser Therapy met to update laser therapy nomenclature, and in 2015, photobiomodulation was officially accepted as a Medical Subject Headings (MeSH) term by the National Library of Medicine.

Photobiomodulation is an innovative therapy that can increase the comfort

Properly trained technicians can take on laser therapy appointments, if state regulations permit, freeing veterinarians for other tasks.

of patients and enhance your practice's multimodal approach to a variety of clinical cases. Knowing how this therapy works and when to best use it is key to its successful implementation.

What Is Photobiomodulation?

When a laser or other form of light within a specific spectrum is applied to tissue, it causes chemical and biological reactions within the tissue that can be both stimulatory and inhibitory, depending on the cellular process. The idea that light can be used for healing is ancient; early Greek physicians observed that exposure to light seemed to help wounds, and sunlight has been noted anecdotally as a healing treatment for centuries.

In the late 1800s, physicians began using red and blue light to treat conditions like Lupus vulgaris, and

in 1903, Niels Ryberg Finsen won a Nobel Prize for demonstrating that concentrated rays of sunlight can stimulate wound healing and kill bacteria. However, because the mechanisms of these actions were not well understood, therapeutic light therapy was, for the most part, excluded from mainstream medicine. That is, until lasers were invented in the 1960s and revolutionized the field.

Although it is a household term now, the word "laser" is an acronym for Light Amplification by Stimulated Emission of Radiation. Lasers are designed to emit and amplify light at specific wavelengths, producing a tight beam of radiation. A laser is essentially a sealed tube where an energy source (the power cord, in the case of most therapy lasers) is applied to a substance contained within the laser between two mirrors.

Depending on the laser's intended use, this substance could be a gas (like carbon dioxide or argon), a liquid, or a solid crystal. The crystal aluminum gallium arsenide is often used in therapeutic lasers. When energy is applied to this substance, it releases light particles called photons, which are amplified by the mirrors at either end of the tube and create a focused beam of light.

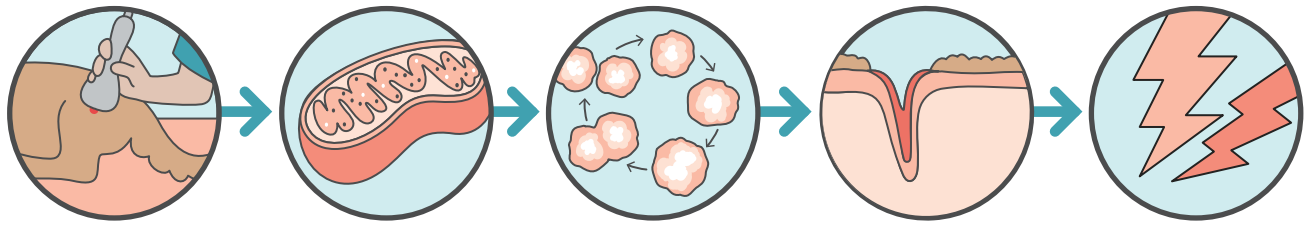
This beam of light then moves along a fiber optic cord to the handpiece, which is applied to the patient. Lasers are able to produce light that is a uniform, single wavelength that can penetrate tissues. Lasers can deliver continuous or pulsed beams of light.

The FDA divides lasers into four classes based on their power. Class III and IV are the most common lasers used in veterinary practice.

Class FDA	Class IEC	Laser Product Hazard	Product Examples
I	1, 1M	Considered nonhazardous. Hazard increases if viewed with optical aids, including magnifiers, binoculars, or telescopes.	<ul style="list-style-type: none"> • Laser printers • CD players • DVD players
IIa, II	2, 2M	Hazard increases when viewed directly for long periods of time. Hazard increases if viewed with optical aids.	<ul style="list-style-type: none"> • Bar code scanners
IIIa	3R	Depending on power and beam area, can be momentarily hazardous when directly viewed or when staring directly at the beam with an unaided eye. Risk of injury increases when viewed with optical aids.	<ul style="list-style-type: none"> • Laser pointers
	3B	Immediate skin hazard from direct beam and immediate eye hazard when viewed directly.	<ul style="list-style-type: none"> • Laser light show projectors • Industrial lasers • Research lasers
IV	4	Immediate skin hazard and eye hazard from exposure to either the direct or reflected beam; may also present a fire hazard.	<ul style="list-style-type: none"> • Laser light show projectors • Industrial lasers • Research lasers • Lasers used to perform LASIK eye surgery

Source: www.fda.gov/radiation-emitting-products/laser-products-and-instruments/frequently-asked-questions-about-lasers

How Does Photobiomodulation Work?



The laser beam is applied to the patient's tissue. Laser light is absorbed by the skin, subcutaneous tissue, muscle, and bone.

Light photons target water, hemoglobin, and cytochrome C oxidase within the mitochondria of cells.

This stimulates protein synthesis and the proliferation of new cells, including cells that form collagen and new blood vessels.

Wound healing is accelerated and inflammation decreases.

More ATP is made in cells, giving them more energy to get back to normal function.

How Does Photobiomodulation Work?

Photobiomodulation uses light photons to target water, hemoglobin, and cytochrome C oxidase at the cellular level in the bloodstream and mitochondria. This stimulates cellular respiration and ATP generation and can also promote the formation of enzymes that fight against oxidative stress, like superoxide dismutase. As a result, a number of secondary effects occur, including:

- DNA and RNA synthesis
- Fibroblast, macrophage, and lymphocyte activation
- Release of growth factors and neurotransmitters
- Vasodilation and increased blood flow
- Collagen synthesis
- Angiogenesis
- Increased oxygen and nutrient availability leading to increased protein synthesis
- Improved cell membrane permeability
- Removal of cellular debris
- Release of endogenous endorphins
- Increased production of anti-inflammatory mediators

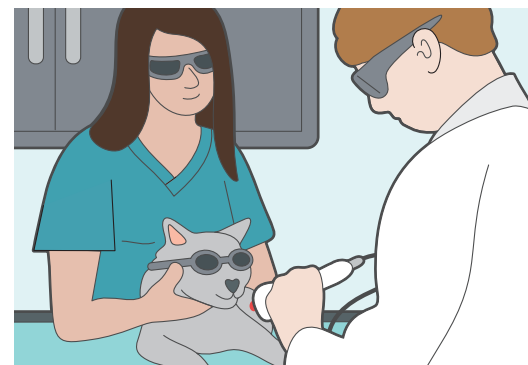
All of these effects contribute to better wound healing, decreased inflammation, and improved analgesia.

Jennifer Johnson, VMD, CVPP, is the immediate past president of the International Veterinary Academy of Pain Management and a member of the *2022 AAHA Pain Management Guidelines in Dogs and Cats* task force. She noted that while photobiomodulation reduces inflammation and pain and speeds healing, knowing the appropriate dose is important in order to achieve the desired effects of the therapy. "Over recent years, appropriate wavelengths and doses have been published, which demonstrate efficacy," she said. It's important for veterinarians to be aware of recommended doses for conditions.

But in terms of photobiomodulation's pain management possibilities, Johnson said, "Using laser therapy in general practice as part of a multimodal pain management program is becoming standard of care in veterinary practice."

What Conditions Can Photobiomodulation Treat?

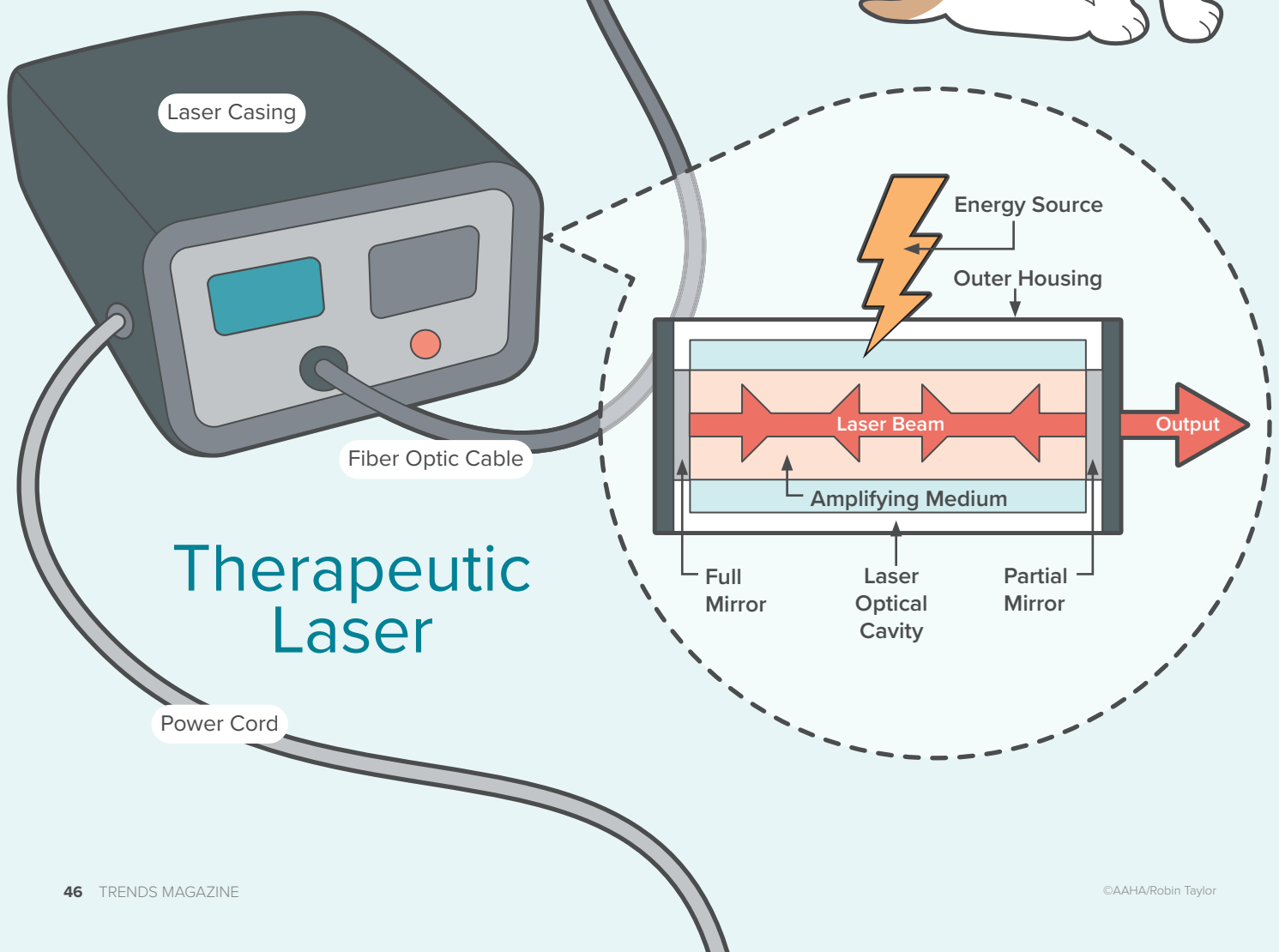
Photobiomodulation therapy can be used in many conditions to increase healing, decrease inflammation, and achieve better pain management for patients. According to Johnson, "When PBMT is combined with pharmacologic pain management, there can be a reduction in the dose of medications necessary."



Photobiomodulation therapy provides an excellent opportunity for technician involvement, and time and investment are required for proper training on its use and safety.

How does a laser work? (A simplified diagram)

1. An electrical current is “pumped” into the laser medium—a gas, liquid, or crystal contained in a cylindrical cavity within the laser casing.
2. The laser medium becomes excited by the energy source and releases photons.
3. The photons are amplified by bouncing light back and forth between a highly reflective mirror and a partially reflective output mirror.
4. Energy builds up.
5. A uniform, single wavelength beam of light is generated.
6. This “laser beam” moves down a fiber optic cord through the handheld piece, and is delivered to the patient.



Therapeutic Laser

PBMT can be useful in the following conditions:

- Sprains and some fractures
- Wounds, abrasions, and hematomas
- Ligament and tendon injuries
- Inflammation in joints, ears, muscles, and skin
- Joint injuries
- Myofascial trigger points, pain points, and deep-tissue acupuncture points
- Chronic and acute pain
- “Hotspots” and lick granulomas
- Postoperative healing

PBMT can also be used for many chronic conditions in dogs and cats, including osteoarthritis, stomatitis, hip and elbow dysplasia, intervertebral disk disease, feline asthma, otitis, and chronic pain.

For canine patients, Johnson noted, “More studies have been published providing good evidence for the use of PBMT in dogs—most recently showing positive effects in the treatment of colitis in dogs and as a treatment for osteoarthritis pain in dogs.”

“Any patient with inflammatory conditions can be a good candidate, for example: dermatitis, cellulitis, gastroenteritis, pancreatitis, cystitis, arthritis, myositis,” said Johnson.

What Conditions Are Contraindicated?

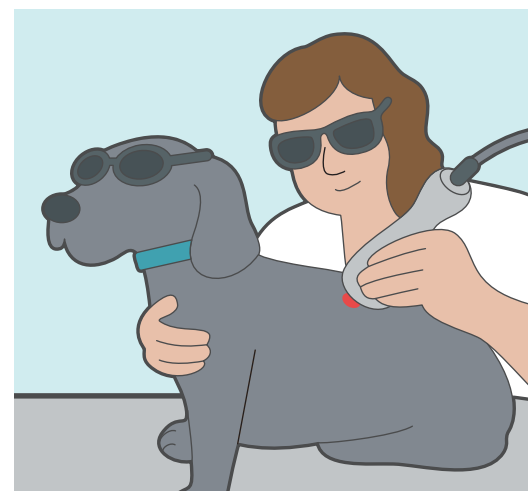
PBMT is generally considered safe for a wide range of applications, but it can be harmful if used incorrectly. Johnson cautions it should never be used on or near the eyes. Both direct and reflected light exposures in the eyes can cause retinal damage, and eye protection should always be worn by both patients and practitioners.

Conditions where caution and special considerations are required include areas in which medications have been injected locally, cancer, pregnancy, open growth plates, and active hemorrhage. Johnson gave an example of when these special considerations come into play: “We always say use caution around obvious tumors, like, for example, dogs get an aggressive skin tumor called [a] mast cell tumor.” She noted that using PBMT judiciously means practitioners must understand what the treatment goals are. “And if I had an inkling or was worried, I wouldn’t do laser therapy on or around it [the tumor], but that wouldn’t preclude me from using it for the hips of this dog with osteoarthritis who happens to also have a skin tumor.”

The therapy should not be used on testicles or the thyroid gland. Areas of hyperpigmentation and tattoos should be monitored carefully to ensure they are not experiencing any heat or discomfort.

PBMT can be used near suture material and tissue adhesives as well as over orthopedic implants. However, if metallic implants are present, they will reflect photons from the light beam into the surrounding tissue. Because of this, the light beam should be angled away from the implant as much as possible and doses should be reduced.

In the past, antimicrobial infections have been considered a contraindication for PBMT, but some recent studies have shown that it may stimulate the immune system and help clear an infection faster. Photosensitizing medication is not considered a contraindication for



“Using laser therapy in general practice as part of a multimodal pain management program is becoming standard of care in veterinary practice.”

JENNIFER JOHNSON, VMD, CVPP

PBMT, based on a 2014 review article that reported no adverse effects.

How Fast Does Laser Therapy Work?

How long and how often PBMT is used depends on the patient’s condition. “Acute conditions will respond quickly,” said Johnson, “sometimes with only one treatment.” She noted that acute otitis is one example where rapid improvement can be seen: “An ear infection in a dog can be treated to reduce the swelling, inflammation, and pain quickly.”

In general, acute conditions can be treated two to three times or more and should show a response after one to two treatments. For chronic conditions, a treatment plan should be made with the patient’s condition and the client’s capabilities in mind.

Benefits of Laser Therapy:

Pain Management

- Release of endogenous endorphins
- Increased production of anti-inflammatory mediators

Decreased Inflammation

- Fibroblast, macrophage, and lymphocyte activation
- Removal of cellular debris

Better Blood Flow

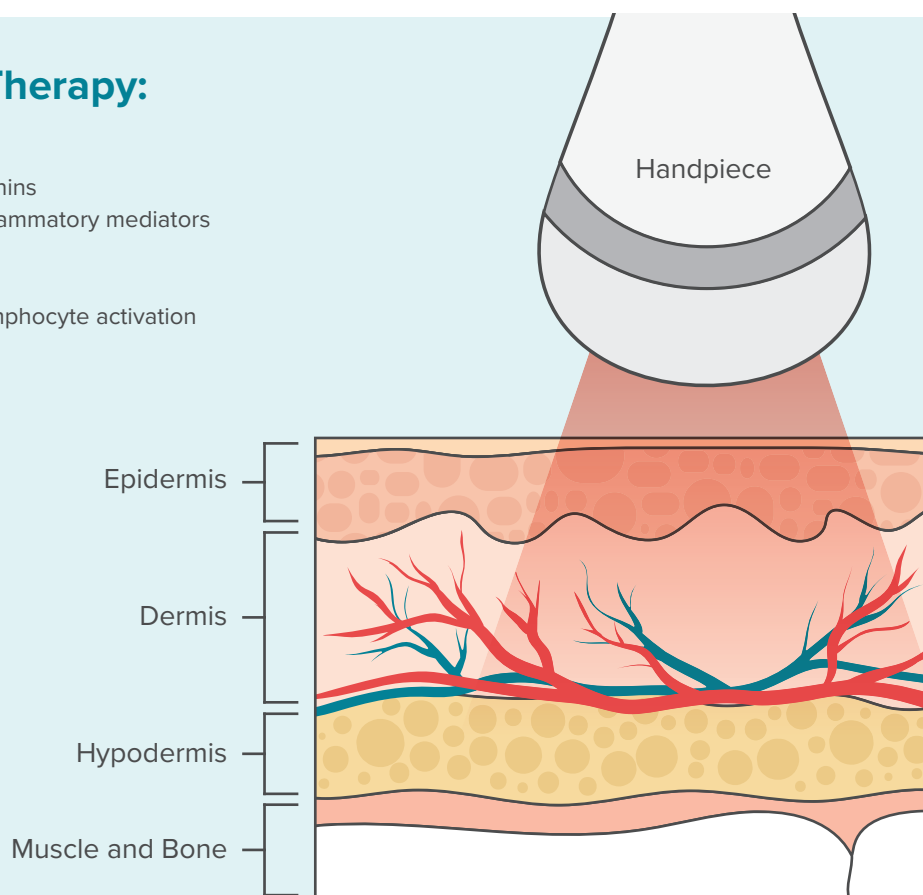
- Increased vasodilation
- Angiogenesis

Faster Healing

- Collagen synthesis
- Increased oxygen and nutrient availability
- Increased protein synthesis and cell growth

Nerve Regeneration and Recovery

- Release of growth factors and neurotransmitters
- Promotion of neuronal sprouting and myelin formation



Initially, patients may be treated daily or two to three times weekly, with a gradual tapering of sessions until maximum effect is achieved.

“Conditions like osteoarthritis can be treated chronically, and we often will start out with once-a-day treatment until there is improvement, then taper treatments slowly over time,” said Johnson. She pointed out that for many of the chronic conditions treated with PBMT, resolving the condition is not possible. In these cases, PBMT becomes an important tool that clinicians can use to alleviate discomfort, provide a better quality of life, and help their patients become more functional. “With conditions such as osteoarthritis,

which have no cure, the treatment is aimed at reducing pain and improving quality of life.”

Considerations for Using Laser Therapy in Practice

PBMT can be a valuable option for comprehensive, multimodal treatment plans for both acute and chronic conditions in dogs and cats. However, there are several factors to consider before adding laser therapy to your practice.

The first step, according to Johnson, is to do your homework. “Not all therapy lasers are equal,” she cautioned. “Just like with so many medical devices, there are many products available that profess

to be effective but are probably not.” She suggests that a resource like *Laser Therapy in Veterinary Medicine: Photobiomodulation*, edited by Ronald J. Riegel and John C. Godbold, Jr., is a good place to start to become familiar with the ins and outs of laser therapy.

Another consideration is how you will integrate laser therapy into your practice, including pricing structure, staff training, client and veterinary team buy-in, and marketing. The location is also important—consider whether there is a dedicated area or room available for PBMT that is quiet, calm, and free of interruption where the patient can relax.

Johnson suggested initially adding PBMT as an adjunctive postoperative pain management strategy. She said, “If you’re a great surgeon, things are going to heal well, but [with PBMT,] they’re going to heal faster. And that’s really nice thing to be able to see quickly.”

PBMT provides an excellent opportunity for technician involvement, and time and investment are required for proper training on its use and safety. Properly trained technicians can take on laser therapy appointments, if state regulations permit, freeing veterinarians for other tasks. “PBMT has to be applied by trained staff in the office,” said Johnson, “and it can be totally [driven by] support staff and technicians.” She recommends the American Institute

of Medical Laser Applications’ training courses for veterinary staff.

Holding a veterinary team training within your practice that explains how PBMT works and why it’s a good option for some patients can help the veterinary team develop consistent messaging when talking to clients. This time can also be used to present your practice’s simple core message about PBMT to the staff, which they can then convey to clients.

Finally, determine how and when information about PBMT will be presented to clients, and in what form. Clients may want to know how effective it is, what it will feel like to their dog or cat, and how long it will take to see results. It may be helpful to have answers and materials

already prepared that can answer clients’ questions, assuage any concerns they may have, and set realistic expectations for therapy.

Johnson pointed out that, compared with 15 years ago when she first started using laser therapy, clients today are pretty savvy and likely have already heard of it. She’ll often tell clients that PBMT works to help cells that aren’t functioning their best get back up to their normal capacity. “It’s just adding to what you’ve already done, to make your outcomes that much better.” ✖



Ingrid Taylor, DVM, is AAHA's technical content specialist.

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Feel Something, Say Something

Recognizing Stress Within the Veterinary Profession

by Lowell Ackerman, DVM,
DACVD, MBA, MPA, CVA, MRCVS

Veterinary professionals and paraprofessionals are stressed, and the causes shouldn't be difficult to discern. But they are not always taken seriously or acted upon with the urgency needed. This shouldn't be the case because we know and fully appreciate the damaging effects of other harmful but invisible elements. For example, veterinary team members realize the importance of wearing radiation dosimeters to track their exposure over time to dangerous ionizing radiation, but there is no such gauge for exposure to repeated stress over time, which can be similarly dangerous. In fact, it would be difficult to even construct such a stress-o-meter for veterinary team members because causes of stress are not necessarily the same for all individuals, and their tolerances for coping with those stresses are also quite personal.

This shouldn't surprise anyone in the profession. We know there are many causes of heart disease, and the pathomechanisms might be quite different, but individuals can adjust and compensate for a certain amount of cardiac dysfunction before it results in a potential common endpoint—decompensation and eventual heart failure. Our approach as medical professionals and paraprofessionals is predictable. We want to understand risk factors for individuals and prevent these problems from ever starting if

It is anticipated that any profession that deals with health issues and life-and-death decisions will have associated stress, and yet this alone does not explain the near epidemic rates of suicide among veterinary team members in many parts of the world.

possible. We employ early detection strategies to determine problems at the earliest opportunity, when we have the most options for changing the course of the disease and effecting successful outcomes.

But if we wait until the problem is clinically evident, we have missed many opportunities to mitigate its adverse effects and have to contend with sometimes heroic efforts to achieve a positive outcome. Stress is no different. We really do have the ability to focus on understanding the causes and put emphasis on prevention and early detection with intervention.

Because causes of stress within the veterinary profession vary with the individual, it can be difficult to make generalizations that would apply to everyone. But we can encourage everyone to be self-aware as to what causes them stress and support them in sharing with trusted team members so solutions can be explored. In addition, veterinary practices can similarly endeavor to create lower-stress workplaces on the basis of what is already well known and studied.

Since many of the deleterious effects of stress tend to be cumulative, and adverse outcomes tend to occur as threshold events, it is not critical that all potential causes of stress be eliminated for major benefits to be achieved. As medical professionals and paraprofessionals, we understand the physiological basis for damage caused by chronic stress in our patients, and yet what does it say if we consider such topics taboo in our discussions with our own team members and managers?

If we are going to recognize the harmful effects of stress—not only on the individual but on the organizations in which they are employed, the clients and patients with which they interact, and the profession in general—then we need to take this seriously. Successful hospital models of the present and future will need to understand the potential causes of stress in veterinary team members and have stress mitigation plans that make these hospitals more desirable places to work. It's not as difficult a challenge as it might first appear, and such an approach pays dividends when it comes to client satisfaction, team member fulfillment, and less

presenteeism (not fully functioning while on the job).

It is anticipated that any profession dealing with health issues and life-and-death decisions will have associated stress, and yet this alone does not explain the near epidemic rates of suicide among veterinary team members in many parts of the world. While the ultimate causes of such extreme reactions to stress are complex, there are some aspects of veterinary medicine that are worthy of reflection in the hopes of better understanding why the profession seems so susceptible to this problem.

Successful hospital models of the present and future will need to understand the potential causes of stress in veterinary team members and have stress mitigation plans that make these hospitals more desirable places to work.





It is important to remember that burnout and compassion fatigue can affect all members of the hospital team, not just veterinarians.

Compassion Fatigue

Compassion fatigue results from the trauma of witnessing and dealing with the suffering of others, so everyone in caring professions is likely similarly at risk to varying extents. There are many stressful events that veterinary teams encounter on a regular basis, including illness, euthanasia, cruelty to animals, and the fact that it is not always possible to provide services to clients who are unable or unwilling to pay.

Veterinary teams want to help animals, but eventually, even the most compassionate individuals can become indifferent or emotionally exhausted by the nonstop nature of caring.

Burnout

While compassion fatigue results from the type of work that veterinary teams deliver, burnout results from stress associated with the work environment itself. This can result

from work overload, conflict in the workplace, lack of control over duties or responsibilities, inconsistency in following hospital policies, workplace incivility, lack of consequences for those in the hospital demonstrating toxic or hostile behavior, not receiving the level of pay that would be commensurate with efforts extended, and many other stressors.

It is important to remember that burnout and compassion fatigue can affect all members of the hospital team, not just veterinarians. Perhaps not surprisingly, burnout is often associated with lower client satisfaction, lapses in patient care, higher medical error rates, increased staff turnover, and a variety of negative behavior patterns that can culminate in suicide.

Compromise Fatigue

Compromise fatigue results from

interpersonal conflict with animal owners and other stakeholders and stress associated with not being able to deliver the level of care desired, either because animal owners don't accept recommendations being made (because they can't or won't spend the money needed) or because of differing goals of clinicians, pet owners, and hospital management.

It can be particularly vexing when clients expect veterinary teams to provide care for their animals that the team did not anticipate and plan for or when they expect that our efforts should be more charitable because we work with animals. In human medicine, the term "moral injury" is sometimes used to indicate the distress that occurs in trying to reconcile the needs of many stakeholders, including the hospital, the patient, the insurer, and the medical team.

Leadership Fatigue

Whether veterinarians are comfortable with the concept or not, they are perceived as leaders by those they work with and within the community at large. However, only a relatively small proportion of practicing veterinarians actively seek out positions of leadership through practice ownership or management roles. Still, many often find themselves responsible for managing others, adhering to policies and procedures, and potentially dealing with crises that are not necessarily of their making. As such, while they may be employees or even independent contractors, there is the expectation that they will accept leadership duties as part of their clinical responsibilities. For veterinarians who have not had leadership training or did not aspire to such positions of leadership, these situations can be extremely stressful, and can exacerbate other sources of anxiety in the hospital setting.

Imposter Syndrome

Imposter syndrome is increasingly being recognized in medical professionals and students. It results from the situation where we feel we need to present ourselves as experts but perhaps do not consider ourselves as such. In a profession where there is some expectation that veterinarians know everything about all species and breeds and are proficient in all disciplines (surgery, ophthalmology, dentistry, emergency, and critical care, etc.), is it at all surprising that individuals may sometimes feel that they don't measure up to the image they are trying to project to the public?

In human medicine, physicians often go through internship and residency programs before they are expected to take full patient responsibility. But in veterinary medicine, there is often a negligible grace period between graduating from veterinary school

and working within the profession with full patient accountability. While there are programs such as mentorships and clerkships that can help improve competencies in multiple disciplines and procedures, it is unrealistic to assume that we can all become experts in all aspects of clinical care—and do so immediately upon graduation.

Mental Health

It's not that veterinary team members have more mental health issues than others, but rather that mental health issues are rising in the population in general, and veterinary team members are no exception. Superimposed on that are situational issues that increase stress, such as the pandemic, uncertainties in the economic markets, pressures of inflation, interpersonal conflict, student debt, climate change, threats against world peace, political divisiveness that has reached catastrophic proportions,



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and the fact that social media has increased bullying, fear of retribution for opinions shared, and general malaise over the state of human interactions. Is there any wonder that rates of depression have climbed and can exacerbate all the other contributing factors to stress in the veterinary workplace?

Conclusion

While there are no simple solutions to the impact of stress on the veterinary profession, the first step is to admit that these stressors are real, and stresses that become manifested are unlikely to resolve on their own. Thus, it is important to realize that hospitals can take concrete steps to reduce stress for team members, which creates better workplace dynamics and more successful practices. For individuals who think admitting that these stressors exist is a sign of weakness, we need to collectively correct this misinformation.

Stress is a natural part of life, and developing coping mechanisms is healthy. But acknowledging that stress can become toxic and can quickly affect our wellbeing and satisfaction with the profession is critical. Seeking help when it is needed is very appropriate for a profession that thrives on caring, preventive care, early detection of problems, and appropriate treatment. Even better is to be proactive and reduce causes of stress before they become critical. This is in everyone's best interest.

Some of this material has been abstracted from Pet-Specific Care for the Veterinary Team. ❖



Lowell Ackerman, DVM, DACVD, MBA, MPA, CVA, MRCVS, is editor-in-chief for both *Pet-Specific Care for the Veterinary Team* and *Blackwell's Five-Minute Veterinary Practice Management Consult, 3rd Edition*, and he lectures globally on medicine and management topics.

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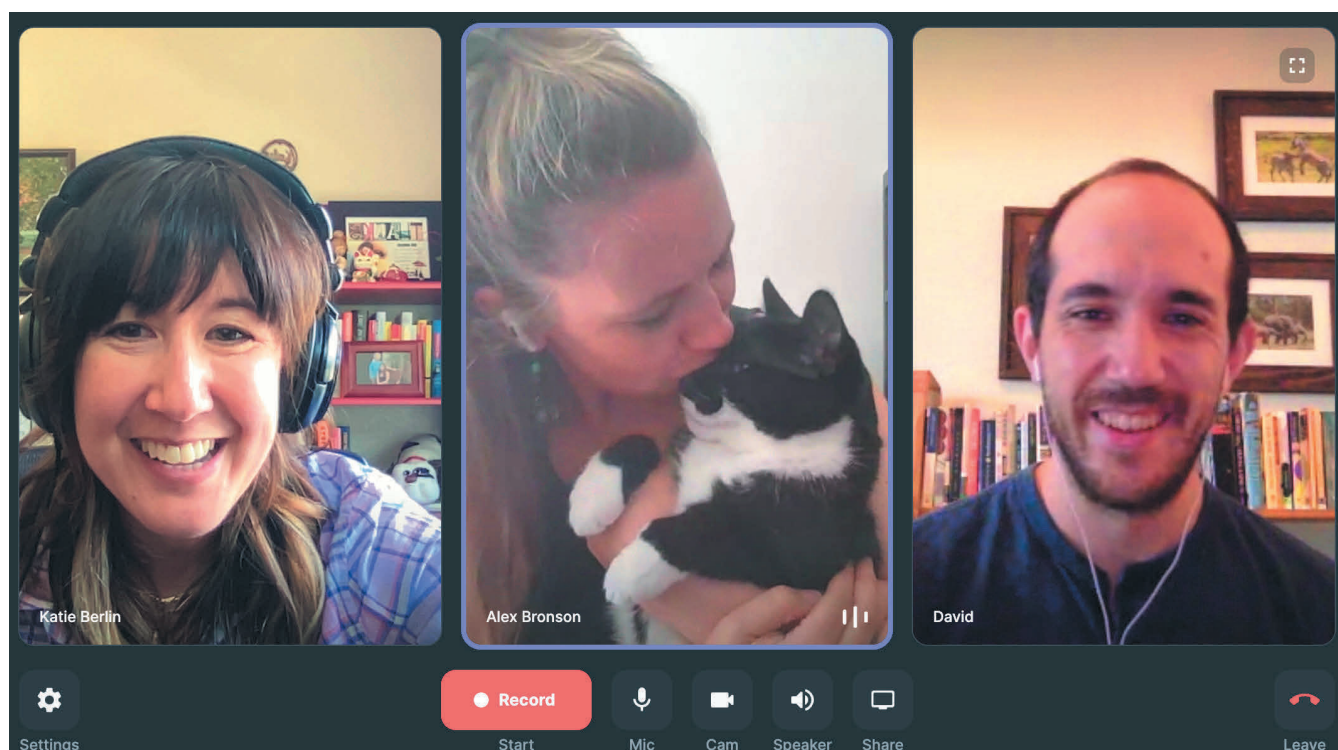
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Across the Exam Table: A Pet Owner's Perspective on Diabetes

Two Pet Owners Discuss How They Navigated a Difficult Diagnosis on
Central Line: The AAHA Podcast

Hosted by Katie Berlin, DVM

Most veterinary professionals know what it's like to have a pet with a chronic illness—or two, or four. . . . But with a career's worth of education, experience, and observation under our belts, it can be hard to remember what the view was like from across the exam table. Most clients have no medical knowledge to lean on when they're facing down their pet's chronic disease diagnosis. The emotional, financial, and logistical burdens a disease like diabetes mellitus places on the average pet owner can be as damaging as the illness itself.

In partnership with Boehringer Ingelheim Animal Health, host Katie Berlin, DVM, spoke with two dedicated pet owners: her brother, David Berlin, and sister-in-law, Alexandra Bronson, both educators in Brooklyn, New York. Their cat, Audrey, was diagnosed with diabetes in the fall of 2021.

David Berlin: When [Audrey's diabetes] diagnosis came, I wasn't super surprised by it because it seemed like all the signs were there. I think we just were sort of struggling with how

to navigate it. I was a little bit hard on myself at first because I felt like I should have seen the signs sooner.

Alexandra Bronson: I started getting really upset thinking about the discomfort that she would be in—thinking about, how long do we have with her and is this a death sentence? Does this mean months? And how do we ensure that she is as comfortable as possible for as long as we can?

Katie Berlin: [Audrey] is just the most loved cat, so I could only

imagine what you must have been thinking then.

DB: Yeah, so I have to shout out [to our vet team] for just being awesome throughout the whole process. They gave me a multipage rundown of all the things to expect and think about, which was really helpful because you're trying to take in all this information and some of the information you find is contrary to other information. So it was really helpful to have this resource that I could go back to.

And they were super patient with me as I had questions. I had some comfort giving her injections [from when] she had allergies and we were giving her medicine that way, but the thing I found most helpful was at the follow-up appointment, they had one of the technicians work with me on giving her injections of insulin and taking her blood sugar from her ears, and we just did it like 5 or 10 times, and just watching them and learning from them was extremely helpful and took a little bit of the anxiety away from doing that.



She also happens to be just a very pliable, agreeable cat, but the reps and the practice were super helpful for me.

KB: That's pretty typical. Veterinarians talk a lot, and then the vet techs come in and do all the work.

DB: Honestly, he was like Mozart with that syringe. I have never seen anything like it. I had been doing the shots the wrong way, or I guess I never really learned. And I should say that I had done, I think, every single administration of the previous injections because Alex has a fear of needles. So then I had to teach her and she ended up being much better at it than I did.

AB: When I go in for my own shots, I apologize to the nurses ahead of time, telling them that the tears are inevitable no matter how good they are. When we learned that Audrey had diabetes and she needed to have injections twice a day, I think that if I were to give a hypothesis of what changed for me, [it's that] this was what Audrey needed in order to continue living.

And as soon as I was able to administer the first shot and she didn't even flinch, I think that it allowed me to just do this rhythmically moving forward.

KB: What was the learning curve like?

AB: For me, the nerves of actually administering the shot dissipated very quickly, and there were two things that created anxiety. It took a little while to figure out the rhythm of getting her blood for her glucose readings. The other thing that was

difficult was navigating the dosage. Administering too much insulin is incredibly scary, and we worked really closely with our vet to understand, based on her glucose curves, how much insulin to give her. But that process was, I think, the most anxiety-producing point for us.

DB: I was really scared to give her too much insulin. I'd read a lot about that. It was all over in the notes. It's like if you're not sure, don't do it. And she had really high blood sugar so we kept increasing the dosage, and then we would check it and it would be super high still, or one day it would slingshot down to low. And we're talking about such astronomically small units [of insulin]. That stuff I think was really way harder than the actual mechanics of doing it.

KB: I've given the diabetes talk so many times, and usually, I worry a lot about [the insulin administration and planning when to schedule the first glucose curve], but once we have that down, I don't know that I have given that too much thought—that fear that if you give too much accidentally or we make the wrong judgment call, it could be catastrophic.

And that's a little bit of an eye opener for me. It's almost like the real work begins—and the real scary part begins—because you know how much responsibility we both have in making sure that we don't do the wrong thing.

DB: Yeah, there was a point where we were giving, I think, one unit, and it did nothing, and so we bumped it up, and whether it was in my head or actual, she seemed really lethargic to me. I was like, oh my god, oh I messed it up, I'm done, what can we



do, should we rub the honey in her gums or whatever or all the things, and in the end, she was fine. But you started looking for every little sign.

KB: Did you elect to do the blood sugar curves at home, or is that the only option that your vet gave you?

DB: They gave us the option of bringing her in and they would do it over 12 hours, but it seemed like something that we could do at home if we could figure it out. We would send them numbers via email, maybe every two weeks, three weeks, and adjust the dosage from there.

She developed pretty severe neuropathy in her back legs from the diabetes, so she was losing the ability to jump and she'd scabble around when she was walking down the hallway. It got pretty serious. I don't think we ever directly discussed it, but in my brain, I was thinking like if this is just going to get worse and worse, at what point are you like, well, this quality of life is not good anymore?

AB: It was clear that she was not only uncomfortable but she also wasn't doing the things that she loved to do. She wasn't as snuggly and cuddly with us as she previously was. In my

mind, I was thinking, can we get her one of those wheelie situations that dogs have, or is she just going to live on a tuffet for the rest of her life?

DB: As the neuropathy got worse, [our vet team] were really responsive to that, and they referred us to specialists. We were having trouble getting the dosage right and her blood sugar, like I said—it boomeranged too high or too low, mostly too high.

And surprisingly in a city like Brooklyn, you think there would be more availability for that, but there really wasn't. So Alex had to take her into Manhattan. They were helpful in parsing whether or not something was an emergency or not, and what to do about it, and what the signs were.

AB: I started writing down her glucose curves so that we could track them and look at them, and I'm a paper person, so I just picked up a journal and then started just writing all of the notes and changes that had happened. It was really helpful to have in one place. When we adjusted the doses, we could help tell the story to the vet and help understand as we were navigating this disease.

It was [also] really helpful for me to talk about my feelings, and I think for David as well, to process how I was feeling in navigating this so that I could make sure that I was monitoring myself and also giving the respect to what I was going through. I remember really clearly the day that David referenced earlier when we gave her insulin and then she was really lethargic afterward. Just kind of recognizing these human emotions was a really important part of the process for me.

KB: It's not just about logistically getting you guys to give insulin. It's about the feelings that come along with having a pet you love so much diagnosed with a chronic disease that has an uncertain future.

DB: I think the knowledge gap when you're coming into it is really large, and so I would have loved to know what a great glucose curve looks like, you know? I understand you don't want to give targets that aren't going to be correct, but I would get the numbers and I really didn't know what to do with them other than send them to the vet. And I was like, okay, it's 275, which is better than it was before [when] it was 490, but that still seems high. What do I do?

We turned in a glucose curve once that we had done every two hours except we missed one of them, and they were like, "You need to do the whole thing again." Which I understand, and I would never want to put a doctor in the position of having to judge with incomplete information and then hold them accountable if it wasn't correct. But it was a little bit deflating because, oh my gosh, we just did this for 12 hours and drew blood and I think maybe sometimes just knowing a little bit more what to expect or when should you panic [would be helpful], I guess.

KB: Dave, first of all, same. I would like to know what normal looks like for diabetes management because it is so hard! Basically, the *Diabetes Management Guidelines* that we have is the closest thing we can come to how to treat diabetes, but the whole disease is a gray area. [Whether a number is too high or too low] depends on the number before

it and the number after it, and the number in three hours, and how long they've been diabetic, and what did they eat that day. . . . It's so tricky to make those judgment calls. But I think we could [always do] a better job of telling our clients what to expect and what to look for and ultimately what our goal was, even if not in numbers.

[One of] the updates that we made to the *Diabetes Management Guidelines* is about continuous glucose monitoring. It's not something everybody is using, and I was wondering if that was something your vet team had ever talked to you about, or if you've ever heard about that other than talking to me since then.

DB: I can't remember if they brought it up. I'm pretty sure I heard about it from you and not from them. I think if Audrey had been less compliant or if Alex hadn't been so good at taking blood from ears, I think something like that would be really helpful. And I think anything you can do like that with cats would also be helpful in the sense that it does probably take a lot of the guesswork out of it. You could take their readings much more easily. I could see that being extremely helpful because I do think that the glucose curve is the hardest part.

KB: [Continuous glucose monitoring is] not perfect either, but it's the vet team doing [the uncomfortable part] and not you, which is a key difference for a lot of people.

Do you feel like [it] would have helped you to have a once-a-day option [for insulin]?

AB: Yeah. Absolutely. Dave and I certainly couldn't even think about doing a weekend away somewhere because we couldn't be gone in the morning and the evening. And so having a once-a-day administration would definitely have made our lives easier.

KB: How's Audrey doing now?

AB: She's lounging on a chair in the sun. She's, I would say, not even just back to normal, I think that she's even sweeter now. It's like she knows how much we have cared for her and how much we care about her, and her physicality is back to 100%, and she is just so sweet.

KB: And she's in remission now, right? You're not having to give insulin now?

AB: Yes.

DB: The vet declared her in remission at the end of March. I was really impressed that her neuropathy went away in a matter of weeks. She's jumping all over the place and she's the best.

KB: You're the perfect situation. However, it still was really hard for you, and it's still a matter of daily life that you think, "Is she going to need insulin again? We have to watch her all the time and make sure." And you still had that guilt at the beginning, even though she's had a wonderful life with you. I think her being the easiest case means in the best-case scenario, it's still a really hard thing.

And Alex, I have this visual from a story Dave told me of you in a fetal position getting a vaccination, possibly sobbing. Props for being that person and also

being this person who could make blood materialize out of a cat's ear.

AB: I was on the ground with a stuffed animal that the nurse had given me while I heard her say to Dave, "Oh, you're strong."

KB: I wasn't gonna let us get away with not telling that story.

AB: I appreciate you both. ✖

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Katie Berlin, DVM, CVA, is AAHA's Veterinary Content Strategist.

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In Their Own Words

Why do you love your job: I love my patients so much (especially the dogs).

Favorite celebrity: Leonardo DiCaprio.

Pets at home: Dean, the lean, mean, old, and grumpy Pomeranian rescue, and Tala, my wild and crazy border collie mix.

What brought you to the profession: The same reason I love my job. I truly enjoy and love pets.

Hobbies outside of work: Hiking, camping, outdoor activities, and crafts!

Favorite book/TV show: I'm going to be repetitive, but I love any books about dogs. Dexter is my favorite TV show.

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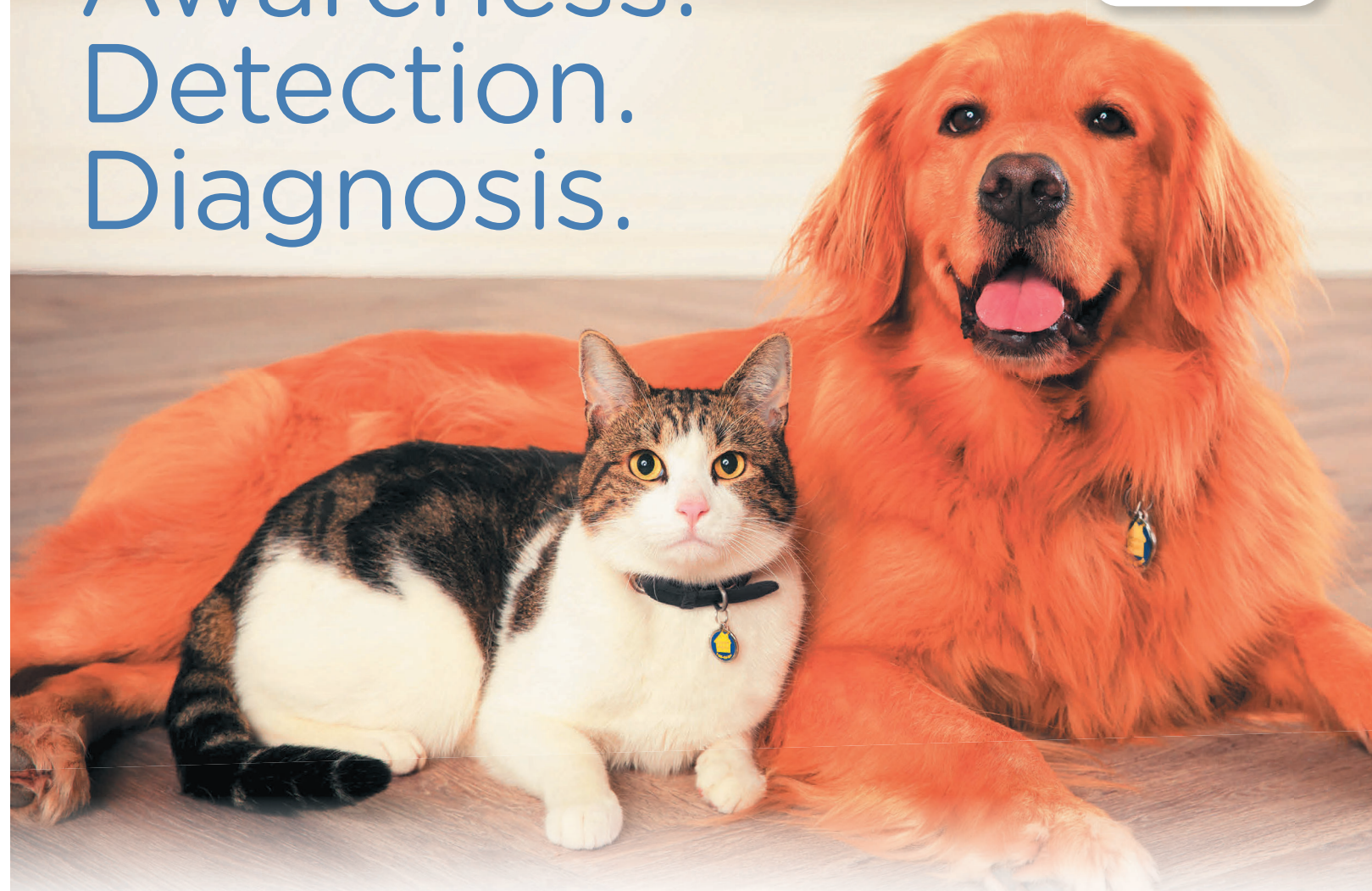
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