6-Point Quality Check? Check.
Every bag and can of Blue Buffalo has passed the BLUE 6-POINT QUALITY CHECK. From ingredients to manufacturing to final product, we make sure all foods and treats meet the highest standards. That ensures you get the quality you expect time and time again.
Oncology myths

San Diego Humane Society will host a canine snuggle session at the 2022 Fetch dvm360® Conference in California
All Insulins Are Not Created Equal

PROZINC® (protamine zinc recombinant human insulin) treatment for diabetes mellitus is the only FDA-approved veterinary 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.

**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.
ProZinc®
(protemic 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 protemic zinc recombinant of human insulin.

Each mL contains: recombinant human insulin 40.44 International Units (IU), protemic zinc sulfate 0.446 mg, zinc oxide 0.008 mg, glycerin 16.00 mg, dibasic sodium phosphate, hydrate 0.78 mg, phenol (added as preservative) 0.05 mg, and acetic acid 1.63 mg, water for injection (maximum) 1035 mg, pH is adjusted with hydrochloric acid and or sodium hydroxide.

Indication: ProZinc® (protemic 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 protemic 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 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 if, and until, 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 (DNA versus animal-source insulin) may result in the need for a change in dosage. Appropriate diagnostic tests should be performed for hyperglycemia in diabetic dogs and cats that are difficult to regulate.

Precautions: Cats and dogs presenting with severe ketonemia, 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®. Hyperglycemia (low blood sugar) was the most common reaction to adverse event. Clinical signs of hypoglycemia were generally mild in nature (described as lethargic, sluggish, weak, trembling, uncoordinated, grasp-lassy-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 reaction were lethargy, anorexia, hypoglycemia (low blood sugar), vomiting, seizures, shaling, diarrhea, and ataxia. Clinical signs of hypoglycemia varied and included seizures, collapse, ataxia, staggering, trembling, twitching, shaling, 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 anorexia. 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, reduction 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 anorexia. 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, reduction 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.

Precaution: If an adjustment in therapy is appropriate, or if alternative therapy should be considered.

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.

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.

Exposure to product may induce a local or systemic allergic reaction in sensitized individuals. In case of contact, immediately flush 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. In case of contact, immediately flush with running water for at least 15 minutes. Accidental injection may cause hypoglycemia.
ON-DEMAND WEBINARS

There’s More Than One Way to Treat a Cat: A Practical Approach to the Spectrum of Care

There’s More Than One Way to Treat a Cat: A Practical Approach to the Spectrum of Care

Specialty: Feline Medicine
Speaker: Kaitlyn Boartright, VMD
Sponsor: Nationwide
RACE-approved: 1.0 CE credit hour

Do you find talking about money stressful? In school, we learn gold standard medicine, but in practice, we must balance client financial limitations with the best interest of our patients. There are flexible ways to get the information we want and need while still working within a client’s means by embracing the concepts of spectrum of care and incremental care.

A BAD Hair Day: A Review of Sebaceous Adenitis

A BAD Hair Day: A Review of Sebaceous Adenitis

Specialty: Dermatology
Speaker: Joya Griffin, DVM, DACVD
Sponsor: Dermoscent Laboratoire
RACE-approved: 1.0 CE hour

Learn the common clinical presentations for sebaceous adenitis and the breeds it affects. Learn how to make a definitive diagnosis and treatment options for best management.

Nonantibiotic Therapy in Diarrhea

Nonantibiotic Therapy in Diarrhea

Specialty: Internal Medicine
Speaker: Karin Allenspach, Dr.med.vet., FVH, PhD, Dipl. ECVIM-CA, FHEA, AGAF
Sponsor: Vetoquinol
RACE-approved: 1.0 CE hour

Antibiotics are no longer commonly used for treatment of acute and chronic diarrhea due to their adverse effects on the gut microbiome and risks for propagating antimicrobial resistance. This talk will focus on causes for acute/chronic diarrhea and the use of diet, probiotics/synbiotics, immunosuppressive therapy (with intestinal biopsy), as well as other novel treatment options in managing these patients.

CONTACT US

Have ideas for future continuing education opportunities or wish to educate fellow colleagues as one of our faculty? Tell us more at CEFaculty@dvm360.com.

LIVE WEBINARS

Nutraceuticals for Joint Health: 2022 Edition!

Nutraceuticals for Joint Health: 2022 Edition!

Specialty: Canine rehabilitation
Speaker: Matthew Brunke, DVM, DACVSMR, CCRP, CVPP, CVA
Sponsor: Vetoquinol
Date: Wednesday, Dec 7, 2022; 7 PM EST
RACE-approved: 1.0 CE credit hour

This webinar will review the most recent literature on the use of nutraceuticals for joint disease. It will review the components of a normal and abnormal joint (one with osteoarthritis) and then cover common nutraceuticals and the evidence available for their use in veterinary medicine. Attendees will receive 1.0 CE Credit Hour.

CONFERENCES

Join us December 2-4 in San Diego, California, for another engaging educational experience, once again face to face. Our safety protocols mean that you can earn CE credits plus interact and network in person with peers, friends, and faculty—all in complete safety! Join keynote speakers Phillip Nelson, DVM, PhD; Peter Weinstein, DVM, MBA; Courtney Campbell, DVM, DACVS-SA; Molly McAllister, DVM, MPH; and Mariana Pardo, BVSc, MV, DACVECC, as well as countless other industry leaders to learn more about dermatology, internal medicine, practice management, exotics, sports medicine and, rehabilitation, and more!

* Please note that our program dates are tentative and subject to change
Meet the Smart Device Making Proactive Care Possible

The Petivity Smart Litterbox Monitor System uses innovative AI technology to transform data about a cat's litterbox behavior and weight into insights about their well-being.

The result? Actionable data that helps cat owners know when a vet visit is needed—enabling earlier intervention and better outcomes for pets.

Petivity identifies behavior and weight changes that may be associated with a health condition requiring veterinary diagnosis, including:

- Urinary Tract Diseases
- Chronic Kidney Disease
- Diabetes
- Hyperthyroidism
- Obesity
  
  Not intended to diagnose, treat, mitigate, or cure any conditions.

To learn more about the innovative technology that drives Petivity, scan here or visit Petivity.com/Vet

PURINA TRADEMARKS ARE OWNED BY SOCIÉTÉ DES PRODUITS NESTLÉ S.A.
STAFF LISTING

EDITORIAL

Chief Veterinary Officer
Adam Christman, DVM, MBA
Vice President, Content, Custom Projects
Colleen Hall
Associate Editorial Director
Kristen Crossley
Director, Veterinary Education
Renea Lewis
Associate Editor
Caitlin McCafferty
Assistant Editors Julia Burke, Sydney Yankowicz
Director, Custom Projects
Robert Alabunda
Managing Editor, Custom Projects
Jeanne Linke
Interior Designer, Custom Projects
Megan Manzana, Shannon Stolz

DESIGN & PRODUCTION

Creative Director, Publishing
Melissa Feiten
Art Director
Wassana Techadilok
Circulation Director
Jan Severn

LIVE EVENTS

Senior Program Manager Shawna Wilker

SALES

Vice President, Sales; MJ Life Sciences* John Hyndrisko
Senior National Accounts Manager
Christina Urri curie@mjhlifesciences.com
National Accounts Managers
Angie Homann ahamann@mjhlifesciences.com
Andrew Wooley awwooley@mjhlifesciences.com
National Accounts Associates
Emily Kelty ekelty@mjhlifesciences.com
Angelia Storino astorino@mjhlifesciences.com
Sales & Marketing Group Coordinator Marissa Silvestri

CORPORATE

President & CEO Mike Hennessy Jr
Chief Financial Officer
Noel Grazier, CPA/CFE
Chief Operating Officer
Michael C. Ball
Chief Marketing Officer
Brett Motillo
Executive Vice President, Global Medical Affairs & Corporate Development
Joe Petreliello

Editorial Advisory Board

Christopher J. Allen, DVM, JD
President, Associates in Veterinary Law, PC
Endwell, NY
info@associateslaw.com

Liz Bales, VMD
Writer, speaker, and featured expert in all things cat
Philadelphia, PA

Marty Becker, DVM
Founder, Fear Free
Adjunct professor, Washington State, Colorado State, and the University of Mississippi Colleges of Veterinary Medicine
North Idaho Animal Hospital
Sandpoint, ID
fearfreepets.com

Jan Bellows, DVM, DAVDC, DABVP
All Pets Dental
Weston, FL
allpetdental.com
dentist@easi.com

Ashley Bourgeois, DVM, DACVOD
Animal Dermatology Clinic
Portland, OR

Antonio Bownes, DVM
Veterinary neurology consultant, Howes’ Lowes’Luminary Veterinary Neurology & Neurosurgery Services (LVNVS)
Associate professor of practice Clinical Neurology and Neurosurgery
University of Arizona College of Medicine-Tucson
Fort Worth, Texas

Matt Brunker, DVM, DACVSMR, CCRP, CVPP, CVA
Medical director, rehabilitation and sports medicine, Veterinary Surgical Centers
Vienna/Leesburg, VA

Kelly Cairns, DVM, DACVim, MS
Veterinarian, executive coaching and leadership development,
Thrive Pet Healthcare
Chicago, IL

Elizabeth “Betsy” Charles, DVM, MA
Executive director, Veterinary Leadership Institute
Adjunct professor, Washington State University
Pullman, WA

Jennifer Chatfield, DVM, DACZM, DACVPM
Dr. Jan the vet
Tampa, FL

Stephen Choi, RVT, SRA, SLAT, VCC, CVPP, VTS-LAM
Anesthesiologist, pain management, and cannabis expert
San Jose, CA

Craig A. Clifford, DVM, MS, DACVIM (Oncology)
Medical oncologist, Hope Veterinary Specialists
Diplomate, American College of Veterinary Internal Medicine (Oncology)
Author, lecturer, and active member of over 15 veterinary advisory boards
Malvern, PA

Steve Dale, CABC
Radio show host, blogger, and animal behavior expert
stevedaleatworkworld.com
Chicago, IL

Jackie Dueñas, DVM
Associate veterinarian, Sunset Animal Clinic
Miami Florida, FL

David Ducy, DVM, MS, CCRP, DACVS-SA
Medical director, Nexus Veterinary Specialists
Chief of orthopedic surgery, Nexus Veterinary Bone & Joint Center
Colluder/codirector, Veterinary Sports Medicine & Rehabilitation Institute
Baltimore, MD
@Ortho_Vet

Louise Dunn
CEO, Snowgoose Veterinary Management Consulting
Winston-Salem, NC

Amanda Dykstra, DVM, MPH, DABVP
Certified diplomat. American Board of Veterinary Practitioners
Shelter consultant and owner of a non-profit group working to improve access to care in Appalachia
Knoxville, TN

Ryan Frazier, LVT
Program chair, Washington State Association of Veterinary Technicians
Member at Large, National Association of Veterinary Technician in America
Committee member, Education and Events, PrideVM
Lyndon, WA

Mary Gardner, DVM
Colluder and OVD, Lap of Love Veterinary Hospice & In Home Euthanasia
Tampa, FL

Bash Halow, LVT, CVPM
Houz Consulting
bashhalow.com
New York, NY

Andrew Haller, DVM
Chief growth officer, IndiVets
Philadelphia, PA

Laurie Hess, DVM, DABVM (Avian)
Owner, director, founder Veterinary Center for Birds & Exotics
Bedford Hills, NY

Lisa Hughston, MED, RVT, CVT, CCRP, DACVS, CVCC
Relief technician, trainer, and consultant San Francisco
Bay Area
San Jose, CA
facebook.com/VetTechXpert

Shadi Ilaifey, DVM, DACVSMR
Chief medical officer
VoTrage
Las Vegas, NV

Boaz Man, DVM
Owner and medical director Boca Midtown Animal Hospital
Boca Raton, FL
bozamidownvet.com

Matt McGlasson, DVM, CVPM
Chief medical officer
Noah’s Ark Animal Hospital
Philadelphia, PA

Charles D. McFadden, DVM
Incoming Medical Director/Owner at GoodGrooming
Mount Laurel, NJ

Tasha McNemey, BS, CVT, CVPP, VT, (SAIM) (ECC)
CEO, founder Veterinary Anesthesia Nerd's
Mount Laurel, NJ

Shawn Messomier, DVM
Paw’s & Claws Holistic Animal Hospital
Plano, TX
pawscoladoganimalhospital.com

Kirsten Oliver, VN, DipAVN (Surgical), CVT, VT (Rehab), CCRP, CVPP
Rehabilitation practitioner Veterinary Surgical Centers
Vienna/Leesburg, VA

Chris Pacheli, DVM, DACVB, CABC
Animal Behavior Clinic
Co-owner of veterinary behavior
Co-owner of Insight Portland
Portland, OR

Kathryn Primm, DVM, CVPM
Medical director
Voorhees Veterinary Center
Voorhees, NJ
kathrynprimm72@gmail.com

Renee Schmid, DVM, DABVT
Manager, veterinary medicine and professional services, Pet Poison Helpline; senior veterinary toxicologist for Pet Poison Helpline/SafetyCall International
Scribner, NE

Rob Silver, DVM, MS
Chief veterinary officer, Real Mushrooms
Founder, medical director Web Pet Dispensary
Denver, CO

Christina V. Tran, DVM
Associate professor and clinical relations lead veterinarian, University of Arizona College of Veterinary Medicine
Board of Directors, Rarebreed Veterinary Partners Past president and founding board member Multicultural Veterinary Medical Association
Chandler, AZ

Fred Wening, VMD, MS, DACVIM (Neurology)
CARE Charlotte Animal Referral & Emergency, Charlotte NC
Owner, 3D Veterinary Printing, LLC Foundation treasurer, Veterinary Neurosurgical Society Adjunct professor University of Missouri
Charlotte, NC

* MJ Life Sciences llc, a division of MJH Life Sciences
** MJ Life Sciences llc, a division of MJH Life Sciences
THE FIRST ORAL BbPi VACCINE WITH PATENTED IMMUNO-MIST-R™ TECHNOLOGY

Just twist and mist for revolutionary protection and comfort.

- Delivers the proprietary formulation as a mist to induce an effective mucosal response
- Offers convenient administration
- Creates a comfortable vaccine experience

Talk to your Merck Animal Health sales representative or distributor representative to place your order of Nobivac® Intra-Trac® Oral BbPi.

Customer Service: 1-800-521-5767 (Monday–Friday, 9:00AM–6:00PM EST)
Technical Services: 1-800-224-5318 (Monday–Friday, 9:00AM–7:00PM EST)

Scan here to learn more.
Finding your holiday happiness: eliminate fear, anxiety, and stress

I know you are not immune to this situation. It’s holiday time and the family is relaxing, eating, entertaining, and watching football. For the most part, everyone is enjoying themselves but you. Why is that? You are the pet expert, yet relatives and guests will nonchalantly feed their pets items that can cause intractable vomiting, diarrhea, and pancreatitis. It’s OK, they say—you’re a veterinary professional and can treat them. They will even ask for the “friends and family” discount the following day when their pet becomes super ill.

The holidays are a great time to show thanksgiving, gratitude, and appreciation. However, we have all noted that veterinary professionals tend to have “office hours” at the holiday table. We do it because we care and genuinely want to educate any pet parent about ways of keeping their pets nice and healthy.

Boundaries are blurred during the holidays. Has any relative leaned into you and started a conversation by saying, “I don’t wanna talk shop but my [insert species] has been [insert clinical signs] for the past few days. What do you think it is?” And although the pandemic and quarantine have made it more challenging to see one another other than it used to be, the challenge comes with fewer boundaries when we do see friends and family face to face.

I have a very good friend who is also my chiropractor, but I wouldn’t dare to ask him to adjust me during the family dinner. Setting a precedent for relatives is a good thing. For example, I have said: “I would be more than happy to see you and Fluffy, but it’s best if you come in for an appointment where I have all the tools and diagnostics I need to properly serve your pet better.” This does tend to work. For some reason, our friends and relatives think we carry around our stethoscope, prescription pad, and radiology machine in our car, enabling us to take a “quick peek” at their pet.

Something I have learned over the years about holiday presents and food is that guests should write a note on the gift that reads “NOT SAFE FOR PETS.” Merely saying it to the host or guest does not resonate as well as writing it down and taping it to the item. I have seen guests move such gifts far out of reach of their dogs, cats, and other pets.

Here are 3 other tips that may be helpful when entertaining guests during the holidays:

1. Place a note on the back door or doggie door that reads: “Did you lock the gate? Is the dog inside?” Sometimes guests go outside to socialize, and fail to notice that the dog (or cat) has snuck out the door. It’s a simple reminder.

2. Plan and confirm ahead of time. Ask if anyone has allergies to pets and make sure your guests know how many animals you have in the house so you know whether to have animals loose, crated, kenneled, and so on. This makes it easier on everyone and less stressful on the veterinary guest.

3. Respect pet parent requests. When they say, “no food or treats because the dog has diabetes,” for example, it must be accepted. I remember one of my friends had a note on her dog’s crate that said, “My eyes will impress, but I make a mess…no treats for me but belly rubs agree with me!”

My parents used to have a sign that read, “The Doctor is RELAXING,” and it rings true today. We need to enjoy the holidays without stressing over pets and taking consults from relatives.

We want to give a special shout out to those who do work during the holidays so that our pets can receive the treatment and care they rightfully deserve. But we also need to take off the doctor/veterinary technician/client service representative cap and truly enjoy ourselves and the human-animal bond this holiday season. As much as we all want to palpate, aspirate, and examine these animals as invited guests, let’s try to simply pet and have fun with them. It will help keep your “why” in check and make you enjoy the holidays, and your career, in a more spectacular fashion.

Wishing you and your family and pets a joyous holiday season full of gratitude, love, and memories.
Flexadin® Advanced with UC-II® Extra Strength is once-a-day joint support for dogs and cats that’s so powerful it is only available from a veterinarian.

Flexadin Advanced products use UC-II®, which is clinically proven to be more effective than glucosamine and chondroitin.1

1. Based on a 120-day clinical study comparing 10 mg active Type II Collagen to 2,000 mg glucosamine and 1,600 mg chondroitin (D’Altilio et al, Toxicology Mechanisms and Methods, 2007).

Flexadin is a trademark of Vetoquinol USA. UC-II® and logo are trademarks of Lonza UC-II® undenatured type II collagen ingredient.
# Table of Contents

**Vol. 53, No. 10, November 2022**

## Departments

<table>
<thead>
<tr>
<th>Page</th>
<th>Department</th>
<th>Description</th>
</tr>
</thead>
</table>
| 8    | From the CVO | Finding your holiday happiness: eliminate fear, anxiety, and stress  
Adam Christman, DVM, MBA |
| 13   | Publisher's note | Veterinary oncology is advancing pet care  
Mike Hennessy Jr |
| 62   | Products+Services360 | Predictive pet health technology, plus raw freeze-dried cat treats and more |

## Contributors

<table>
<thead>
<tr>
<th>Page</th>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
</table>
| 73   | Vet World View | Obtain a cat’s consent for care  
Steve Dale, CABC |
| 74   | The Dilemma | The overprotective pet owner  
Marc Rosenberg, VMD |

## From the Cover

**40 Oncology myths**  
Experts debunk common misconceptions in veterinary oncology  
Tasha Otrowski, RVT; Heather Towie Millard, DVM, MS, DACVS-SA

## From the CVO

Finding your holiday happiness: eliminate fear, anxiety, and stress  
Adam Christman, DVM, MBA

## Publisher's Note

Veterinary oncology is advancing pet care  
Mike Hennessy Jr

## Products+Services360

Predictive pet health technology, plus raw freeze-dried cat treats and more

## Vet World View

Obtain a cat’s consent for care  
Steve Dale, CABC

## The Dilemma

The overprotective pet owner  
Marc Rosenberg, VMD

---

*Cover image: Agrino, You, Hulinska Yevheniia/AdobeStock, Design by Wassana Techadilok*
Are your patients getting the canine osteoarthritis (OA) pain and inflammation relief they need?

Recommend Galliprant as first-line treatment

- **FIRST-IN-CLASS** non-COX inhibiting NSAID
- **MODE OF ACTION TARGETS** canine OA pain and inflammation while reducing the impact on GI, kidney, and liver homeostasis
- **FOR ALL STAGES** of OA from the earliest clinical signs*

*Approved for use in dogs older than 9 months of age and greater than 8 pounds. Monitoring is recommended if used long-term.

**INDICATION**
Galliprant is an NSAID that controls pain and inflammation associated with osteoarthritis in dogs.

**IMPORTANT SAFETY INFORMATION**
Not for use in humans. For use in dogs only. Keep this and all medications out of reach of children and pets. Store out of reach of dogs and other pets in a secured location in order to prevent accidental ingestion or overdose. Do not use in dogs that have a hypersensitivity to grapiprant. If Galliprant is used long term, appropriate monitoring is recommended. Concomitant use of Galliprant with other anti-inflammatory drugs, such as COX-inhibiting NSAIDs or corticosteroids, should be avoided. Concurrent use with other anti-inflammatory drugs or protein-bound drugs has not been studied. The safe use of Galliprant has not been evaluated in dogs younger than 9 months of age and less than 8 lbs (3.6 kg), dogs used for breeding, pregnant or lactating dogs, or dogs with cardiac disease. The most common adverse reactions were vomiting, diarrhea, decreased appetite, and lethargy. For full prescribing information see Galliprant package insert.

**REFERENCES**

Galliprant, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates. ©2021 Elanco or its affiliates. PM-US-20-1498

Go to GalliprantVet.com for more information
**GALLIPRANT®** (grapiprant tablets)

**For oral use in dogs only**

20 mg, 60 mg and 100 mg flavored tablets

A prostaglandin E₂ (PGE₂) EP4 receptor antagonist; a non-cyclooxygenase inhibiting, non-steroidal anti-inflammatory drug

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

Before using Galliprant, please consult the product insert, a summary of which follows:

**Indication:**

GALLIPRANT (grapiprant tablets) is indicated for the control of pain and inflammation associated with osteoarthritis in dogs.

**Dosage and Administration:**

Always provide “Information for Dog Owners” Sheet with prescription.

Use the lowest effective dose for the shortest duration consistent with individual response.

The dose of GALLIPRANT (grapiprant tablets) is 0.9 mg/lb (2 mg/kg) once daily.

Only the 20 mg and 60 mg tablets of GALLIPRANT are scored. The dosage should be calculated in half tablet increments. Dogs less than 8 lbs (3.6 kgs) cannot be accurately dosed.

The 100 mg tablet is not scored and should not be broken in half.

See product insert for complete dosing and administration information.

**Contraindications:**

GALLIPRANT should not be used in dogs that have a hypersensitivity to grapiprant.

**Warnings:**

Not for use in humans. Keep this and all medications out of reach of children and pets. Consult a physician in case of accidental ingestion by humans.

**For use in dogs only,** Store GALLIPRANT out of reach of dogs and other pets in a secured location in order to prevent accidental ingestion or overdose.

**Precautions:**

The safe use of GALLIPRANT has not been evaluated in dogs younger than 9 months of age and less than 8 lbs (3.6 kg), dogs used for breeding, or in pregnant or lactating dogs.

Adverse reactions in dogs receiving GALLIPRANT may include vomiting, diarrhea, decreased appetite, mucoid, watery or bloody stools, and decreases in serum albumin and total protein.

If GALLIPRANT is used long term appropriate monitoring is recommended.

Concurrent use with other anti-inflammatory drugs has not been studied. Commonly used protein-bound drugs include cardiac, anticonvulsant and behavioral medications.

Drug compatibility should be monitored in patients requiring adjunctive therapy. Consider appropriate washout times when switching from one anti-inflammatory to another or when switching from corticosteroids or COX-inhibiting NSAIDs to GALLIPRANT use.

The use of GALLIPRANT in dogs with cardiac disease has not been studied.

It is not known whether dogs with a history of hypersensitivity to sulfonamide drugs will exhibit hypersensitivity to GALLIPRANT. GALLIPRANT is a methylbenzenesulfonamide.

**Adverse Reactions:**

In a controlled field study, 285 dogs were evaluated for safety when given either GALLIPRANT or a vehicle control (tablet minus grapiprant) at a dose of 2 mg/kg (0.9 mg/lb) once daily for 28 days. GALLIPRANT-treated dogs ranged in age from 2 yrs to 16.75 years. The following adverse reactions were observed:

Table 1. Adverse reactions reported in the field study.

<table>
<thead>
<tr>
<th>Adverse reaction*</th>
<th>GALLIPRANT (grapiprant tablets) N = 141</th>
<th>Vehicle control (tablets minus grapiprant) N = 144</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Diarrhea, soft stool</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Anorexia, inappetence</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Lethargy</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Buccal ulcer</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Immune mediated hemolytic anemia</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

*Dogs may have experienced more than one type or occurrence during the study.*

GALLIPRANT was used safely during the field studies with other concurrent therapies, including antibiotics, parasiticides and vaccinations.

To report suspected adverse drug events and/or to obtain a copy of the Safety Data Sheet (SDS) or for technical assistance, call 1-888-545-5973.

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/AnimalVeterinary/SafetyHealth

**Information for Dog Owners:**

Owners should be advised of the potential for adverse reactions and be informed of the clinical signs associated with drug intolerance. Adverse reactions may include vomiting, diarrhea, decreased appetite, and decreasing albumin and total protein. Appetite and stools should be monitored and owners should be advised to consult with their veterinarian if appetite decreases or stools become abnormal.

**Effectiveness:**

Two hundred and eighty five (285) client-owned dogs were enrolled in the study and evaluated for field safety. GALLIPRANT-treated dogs ranging in age from 2 to 16.75 years and weighing between 4.1 and 59.6 kgs (9 – 131 lbs) with radiographic and clinical signs of osteoarthritis were enrolled in a placebo-controlled, masked field study. Dogs had a 7-day washout from NSAID or other current OA therapy. Two hundred and sixty two (262) of the 285 dogs were included in the effectiveness evaluation. Dogs were assessed for improvements in pain and function by the owners using the Canine Brief Pain Inventory (CBPI) scoring system. A statistically significant difference in the proportion of treatment successes in the GALLIPRANT group (63/131 or 48.1%) was observed compared to the vehicle control group (41/131 or 31.3%). GALLIPRANT demonstrated statistically significant differences in owner assessed pain and function. The results of the field study demonstrate that GALLIPRANT, administered at 2 mg/kg (0.9 mg/pound) once daily for 28 days, was effective for the control of pain and inflammation associated with osteoarthritis.

**Storage Conditions:**

Store at or below 86°F (30°C C)

**How Supplied:**

20 mg, 60 mg and 100 mg flavored tablets in 7, 30 and 90 count bottles

NADA 141-455, Approved by FDA

Manufactured for:

Elanco US Inc.

Greenfield, IN 46140

Galliprant is the registered trademark of Aratana Therapeutics, Inc. Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates.

November 2018
November is National Pet Cancer Awareness Month, and we’re shining a brighter spotlight on the importance of veterinary oncology.

In an interview with dvm360®, Andi Flory, DVM, DACVIM (Oncology), winner of the 2022 Veterinary Heroes® award for Oncology, discussed what makes her specialty unique in veterinary practice. She noted that veterinary oncologists often come into a pet’s life at an intense and dark moment. However, they also educate clients about their options and can provide hope. “We develop such an immediate and intense bond with families,” said Flory.

In this issue of dvm360®, we highlight more of the value of veterinary oncology with our cover story by Tasha Ostrowski, RVT, and Heather Towle Millard, DVM, MS, DACVS-SA. Starting on page 40, these experts debunk common cancer myths associated with young pets, mast cell tumors, and cancer diagnoses. (This article is published in partnership with Blue Pearl specialty and emergency pet hospital.)

Additionally, an article on page 18 features the annual Nationwide Pet Cancer Awareness Walk. Held throughout November in a virtual format, the event is sponsored by Nationwide Pet Insurance in partnership with the ACF. The goal of the walk is to fund research for finding cures for pet and human cancers.

Additional coverage of the veterinary oncology space can be found online at dvm360.com, including session recaps from recent veterinary conferences. Highlights include a keynote session presented by Craig A. Clifford, DVM, MS, DACVIM (Oncology), at the Atlantic Coast Veterinary Conference in Atlantic City, New Jersey, that provided an overview of the latest advancements in canine oncology. These advancements include chemotherapy-sensitive assays that rely on artificial intelligence to predict a patient’s drug response; a new, FDA-approved tablet to treat canine lymphoma; and a new, noninvasive blood test for early detection.

We hope you’ll find this information useful in practice and continue to spread awareness about pet cancer with clients, especially this month.

—Mike Hennessy Jr
President & CEO,
MJH Life Sciences®

REFERENCES
Conversations about cancer are tough, but the groundwork you lay makes all the difference in preparing the pet owner to make the best possible choices for their pet and situation. Try these strategies to help them get the most from an oncology consultation.

**USE THE “C” WORD WHEN APPROPRIATE**

When delivering news of a difficult diagnosis, veterinarians do everything they can to help the pet owner understand their pet’s condition and needs. Being clear and succinct about the pet’s diagnosis and possible prognosis is helpful in setting up a successful oncology referral. Even when we think we are using the simplest possible language, we are often still talking at a level above the average pet owner’s medical understanding. For a client, the word “tumor” or “neoplasm” often signals localized disease that can be removed or treated and that will result in cure. Thus, it is important to use the word “cancer” if a particular tumor can spread so clients understand the difference between a localized tumor that can often result in cure with treatment and one that is cancerous that may or may not result in cure with treatment. This is not to advocate the overuse of the term “cancer,” nor to scare clients away from treatment, but it is a term they have heard of and are likely familiar with in their daily lives. When used appropriately with clients, it can help them come to terms with the diagnosis. There are many treatment options for the numerous cancers diagnosed in human and veterinary medicine. There is hope and cure with many cancers.

**START WITH A CONSULTATION**

Anytime a difficult diagnosis is made, the pet owner is stressed. The moment we say, “I’m so sorry to tell you this, but…” they are likely to become overwhelmed and often won’t recall details of the conversation. This often leads to frustration on the client’s part as they don’t remember information about the diagnosis. It can also cause frustration on the veterinarian’s part as it can take multiple similar conversations before the client understands the diagnosis and prognosis. It might be very tempting to tell the client to seek an oncology consultation so the onus falls on someone else to help them understand. However, anything we can do to help pet owners experience and work through that emotional response will help them be more prepared to talk about what they want for their pet when they get to a referral appointment with a specialist.

Although discussing all treatment options and outcomes is the purpose of an oncology consultation, having clients mull over their goals for their pet is important so they get...
the most out of the discussion. Some questions to help them get started with their goals are: Do you want more time? Are you open to all treatment options or only some? Do you want a cure if this is possible and are you willing to be aggressive with treatment? Would you consider radiation therapy to shrink the tumor? How about surgery, chemotherapy, or radiation, in cases where an oncology referral may not be needed.

Having well-thought goals beforehand will allow the consultation to be tailored to the treatments and specifically line up with the client’s goals. It is also a good idea to discuss why you’re referring them to one particular oncology or surgery specialist rather than another. If you learn in that conversation the pet owner is absolutely against surgery, for example, a medical oncologist or radiation oncologist might be a better choice.

**OFFER READING MATERIAL OR ONLINE SOURCES OF CLIENT EDUCATION**

Providing written information about the pet’s diagnosis that clients can refer to at home and research on their own is helpful for when they have had time to process the diagnosis. They may need to explain the diagnosis to a spouse or another family member. And as they decide about next steps, more information is better. A quick handout that they can refer to can make a dramatic difference. This does not have to be time-consuming to put together—simply include the 4 bare basics: whether the tumor is cancerous or benign, some options that can be discussed during the consultation, the prognosis, and whether the tumor is curable. This is excellent information to email to the client or provide in their discharge packet. Alternatively, there are several good sources of cancer information online to which you can direct clients.

**OFFER TO ANSWER FOLLOW-UP QUESTIONS**

We know how busy you are, and offering a referral to an oncologist will give the client the most information about their pet’s diagnosis. But we also know you want the best for your patients and clients. An upset pet owner may not know what to ask when the diagnosis is first explained to them but as the information starts to sink in, they will have more questions. Allowing follow-up calls and answering questions you feel comfortable answering will have them better prepared for an oncology consultation.

**GIVE THE SPECIALIST A CALL**

As specialists, we follow our areas of interest closely. Research in the field of oncology is moving at an incredible pace. A quick review of literature, in addition to calling your trusted oncologist, can be helpful in obtaining the most accurate and up-to-date information regarding the prognosis as well as facilitating a referral. Oncologists are happy to be a resource to referring doctors when they are making decisions about whether and to whom to refer an oncology case.

There are 3 subspecialities within oncology: medical, radiation, and surgical oncology. Speaking to an oncology doctor can help determine which oncology service is most appropriate for a referral. Getting a rough idea of possible recommendations and costs associated with next steps in diagnostics and treatments is helpful to clients.

**MAKE SURE YOUR MEDICAL RECORDS ARE COMPLETED**

It is imperative for the specialist and the client to have an updated copy of written medical records, laboratory work, pathology reports, and imaging studies and reports at the time of the oncology consultation. Incomplete records or missing diagnostics can often lead to delays in treatment or in unwarranted costs of repeating diagnostics. Have your client request a consultation date such that you have sufficient time for diagnostic results to come in and for you to complete your records and inform clients of the results.
You may want a chance to reset and relax after all the learning that you will experience at the upcoming Fetch dvm360® Conference in San Diego, California, December 2-4. If so, the San Diego Humane Society (SDHS) will have some of its canine ambassadors in the exhibit hall during the evening receptions to spend some time snuggling up with attendees. These dogs are adopted canines that must meet certain requirements to travel with the SDHS, such as being up to date on vaccines, completing an annual health evaluation, and being spayed or neutered.

Through the program, the canines attend education, community, and conference events with their owners and SDHS members to give individuals the chance to snuggle up to some dogs that bring joy and comfort to those around them.

“This is going to be an opportunity for people to take a break from their day and their busyness and just get a moment to decompress with the animals. The animals that we’re sending are canine ambassadors, so these are volunteers with us, but they do this as their job, [and] their job is to make people feel happy. So they’re going to be working their magic and helping people to have a laugh, have a smile, spend a moment with them, and connect,” Laura Leonard, community outreach manager for the SDHS, said in an interview with dvm360®.

For Leonard, these events give the SDHS the chance to provide comfort to the community and help them destress. With veterinary professionals, she understands the stress and toll this profession can have on those within the industry. Because of this, the canine ambassadors will help give back to the community that takes care of them through moments of playtime and snuggling.

“Everyone needs a moment sometimes to have some happiness and some brightness in their day. Things are hard in the world, [and] sometimes hard for individuals. In [the] animal welfare field, we experienced a lot of loss and a lot of stress. So just taking a moment to really enjoy the animals and spend time with them helps to reenergize us, and do what we love while connecting back with the community,” said Leonard.

Attendees at this conference can visit the society’s booth in the exhibit hall to meet 3 or 4 canine ambassadors, participate in the snuggle session, learn more about opportunities at the SDHS, and discover more information about pets available for adoption.

If you have not registered yet, there is still time! Visit https://bit.ly/FetchSD2022 or scan the QR code to learn more about the 2022 Fetch dvm360® Conference and secure your spot.

REFERENCE

Two critically endangered female blue-billed curassows are born at Smithsonian’s National Zoo and Conservation Biology Institute

The Smithsonian’s National Zoo and Conservation Biology Institute in Washington, DC, announced that 2 female blue-billed curassows, members of a critically endangered species, have hatched: Aluna, on August 5, and her sister, Lulo, on August 28. They are the first offspring of 6-year-old Jackie, JB, the 16-year-old father, has also fathered chicks at another institution.

According to an organizational release,1 keepers noted that the sisters, which are being monitored off-exhibit, were doing well and described them as “confident and curious.”

Jackie arrived at the zoo in 2016 and JB in 2019, after a breeding recommendation from the Association of Zoos and Aquariums’ Species Survival Plan. Female curassows incubate their eggs for 29 to 31 days, but Jackie did not display any interest in doing so. Since it was clear to the team that she would neither accept nor bond with the chicks, the eggs were placed in an incubator.

Keepers decided to hand-raise the chicks to offer them the best chance of survival. Aluna and Lulo imprinted, or socially bonded, with the animal care team, and received adult feathers to cuddle under and a mirror that provides “socialization” when keepers are away.

“Every moment with these chicks has been a dream come true for me,” said animal keeper Heather Anderson in the release. “I have had the goal to breed the blue-billed curassow since my first year of zookeeping. It was amazing to watch these precocial birds as their instinctual abilities to eat, perch, and preen their feathers kicked in—all in the first day of life! For other bird species, those milestones could take weeks to achieve.”

Blue-billed curassows are native to Colombia and classified as critically endangered by the International Union of Conservation of Nature. It’s estimated that only between 1000 and 2500 remain in the wild, according to the release.1 The birds, which once inhabited all of northern Colombia, currently live in only a few small areas of tropical lowland forest. They are threatened primarily by habitat loss and fragmentation.

REFERENCE

OSU study shows increased risk factors for blood disease in cattle

University Products LLC has spotlighted data from a recent study by The Ohio State University (OSU) on the prevalence of Anaplasma marginale and linked risk factors in beef cattle in Ohio. The study is the first study of its kind to report bovine anaplasmosis in Ohio herds. The findings showed an estimated statewide molecular prevalence of 38.53% (95% CI, 33.26%-43.81%), with some farms experiencing higher prevalence than others (19.40%-56.86%).

Anaplasmosis is a blood disease carried by parasites that infects red blood cells, causing severe anemia and death. This leads to an annual global cattle loss amounting to approximately $14 to $19 billion, according to a news release.2

Louisiana-based University Products has developed the only effective vaccine against anaplasmosis that has been approved for experimental use and successfully deployed in the United States, Puerto Rico, and South America for over 20 years. Anaplasmosis treatments usually consist of a tetracycline antibiotic, or chlorotetracycline supplied in feed and mineral supplements. All antibiotic treatments require a Veterinary Feed Directive (VFD) for oral use, with most veterinarians warning that cows may not eat a sufficient amount for treatment to be effective.

With recent FDA antibiotic restrictions,3 producers must have a confirmed case of anaplasmosis to receive a VFD. The disease is especially harmful because most ranchers and producers don’t recognize signs of infection until a cow is dead. By then, most of the rest of the herd will already be infected.

Visit dvm360.com for references

REFERENCE
Over 100,000 professionals earn Fear Free designation

According to Fear Free, LLC, over 100,000 veterinary and pet professionals have been certified as Fear Free Certified Professionals. Certification enables these professionals to help prevent and ease fear, anxiety, and stress in animals.

“Hitting this amazing milestone is a testament to how widely Fear Free education and certification has been embraced by those in the animal care industry,” said Fear Free CEO Ruth Garcia in an organizational release. “As we continue to build out the ecosystem of Fear Free Certified Professionals, more and more pets and pet owners will be able to benefit from better access to Fear Free care.”

According to the release,1 since 2016, Fear Free has provided more than 248,000 veterinary professionals, pet professionals, animal welfare employees and volunteers, and pet owners with online education. Through these programs, veterinary professionals, animal trainers, pet sitters, groomers, and pet board and daycare providers can complete their desired certification program and sign a Fear Free Pledge. The pledge is to uphold a humane, emotionally protective code of conduct and ethical standard for care and professionalism.

“Putting pets’ emotional well-being at the forefront was the founding principle of Fear Free,” said Marty Becker, DVM, founder of Fear Free. “I congratulate each and every one of these extraordinary professionals for their dedication to protecting animal health and happiness and making this milestone possible.”

REFERENCE

Gear up for the 2022 Nationwide Pet Insurance Pet Cancer Awareness Walk

By Julia Burke, Assistant Editor

November marks National Pet Cancer Awareness Month. To raise awareness for the cause and help advance research in this field, the annual Nationwide Pet Cancer Awareness Walk, sponsored by Nationwide Pet Insurance, in partnership with the Animal Cancer Foundation (ACF), launched November 1, 2022, and will run through November 30, 2022.

This marks the 12th year Nationwide has supported ACF during Pet Cancer Awareness Month, and the third year the challenge is taking place virtually via the WoofTrax mobile app. This empowers anyone anywhere to get involved, and as Cheryl Steinhauer, director of development at ACF, said, “We’re all walking our dogs anyway, so we might as well log on to the WoofTrax app and help lead to a cure.” Once participants enroll in the Nationwide Pet Cancer Awareness Walk in the app, it records their mileage as they walk or run with their dog, and Nationwide donates 25 cents to Animal Cancer Foundation for each mile.

Additionally, ACF enlisted longtime supporter of the organization Renée Felice Smith, renowned actress who played Neil Jones on NCIS: Los Angeles, as the ceremonial grand marshal to build excitement.

Supporting cancer research

ACF is a 501(c)(3) organization that funds comparative oncology research, the aim being that if we better understand canine cancer, we can understand human cancer better as well and make significant strides toward a cure in both realms. For the Nationwide Pet Cancer Awareness Walk, Nationwide is Animal Cancer Foundation’s title sponsor; but more of the foundation’s charitable corporate partners are pledging donations in support the research the organization funds.

Barbara Cohen, MS, executive director at ACF, shared, “Our biggest project is for canine cancer genomic research and the Canine Cancer Genome Project [sponsored with an inaugural gift from Blue Buffalo Foundation]. That’s a multimillion-dollar project of several institutions to map cancer genomes and dogs, and place that information into a shared cancer research dataset so every researcher can look at that.

“I describe it as like tic-tac-toe. You have the human cancer genome, and you have very similar cancers with dogs. As you start to decode these things and match them up side by side, you can see what’s similar and what’s different, and what works and what does not more quickly with [this] research,” she added.

Multifaceted benefits of the walk

Along with contributing to a good cause, engaging in the walk encourages participants to exercise more regularly with their dog, benefiting both the pet owner and their pup.

“I participated in [the walk] myself, while I was running it on behalf of the organization. From a personal experience of using the [WoofTrax] app and walking toward a cause that I could feel passionate about, every day of that challenge period, I really got outside with my dogs,” said Cohen. “It was a health booster because we went further because we’re motivated by that little map [tracking mileage], and [the] dogs benefited by dropping a little weight that I know our veterinarians want them to lose.”

Cohen added that it also offers participants the opportunity to invite friends to join the cause, whether that’s walking or making a donation. “It was amazing to me, the interaction from [encouraging friends to join the challenge] and the circles of influence that we all have in and around our pets that we don’t think about until we actually do something like this.”

This year’s goals

“The sky is the limit,” Steinhauer said of the ACF’s goals for this year’s Nationwide Pet Cancer Awareness Walk. She noted that at last year’s event, 322,000 walks were taken throughout the challenge. Cohen would like to see millions taken this year.

Along with hoping that many get involved, the duo believes the funds can ultimately help contribute to research finding cures for canine and human cancer. “We’re all taking the positive step that we can. I’m a big believer that positivity begets positivity... We can push toward a cure if we’re working together,” concluded Cohen.

Get involved

Participants can enroll in the Nationwide Pet Cancer Awareness Walk challenge via WoofTrax and select a local shelter to walk for. Then, leash up a dog and log in to track miles. Those without a pet can take part in the challenge with a virtual dog assigned by WoofTrax.

Other ways to get involved include making a donation to ACF, supporting an individual or team fundraiser, and encouraging others to join the challenge.
Senior patients?

SILVER® LINE
HELPS IMPROVE THE COMFORT OF SENIOR ANIMALS
- SKIN, BEHAVIOR & MOBILITY -

NATURAL BASED INGREDIENT

TRENDS SETTING INNOVATIONS SINCE 2003

SCIENTIFICALLY PROVEN EFFICACY

EASE OF USE FOR HIGH COMPLIANCE

Made in France by LDCA, a Nextmune company

www.dermoscent.us

Distributed in the USA by Nextmune US
The use of topical therapies in pets can be grouped around 4 main goals: treat infections and prevent their recurrence, decrease seborrhea or greasy skin texture, treat or prevent pruritus, and improve the skin barrier. Each of these goals and the treatments used to achieve them will be considered individually in the following sections.

**TREAT INFECTIONS AND PREVENT RECURRENCE**

Bacteria and yeast infections on the skin are a common dermatological concern. Superficial infections are ideally treated with topicals alone, and maintenance use of antimicrobial or antifungal agents can help prevent infection recurrence.1,2 Generally, shampoos can be applied 1 to 2 times weekly to treat infection, and 2 to 4 times monthly to prevent infection recurrence. Topicals such as sprays, wipes, or mousses can be used up to once or twice daily until the infection is resolved, then every 2 to 3 days to prevent recurrence.

- **Chlorhexidine** is an antimicrobial and antifungal product that is usually present in 2% to 4% concentrations. It is broadly antimicrobial and has antifungal efficacy against *Malassezia pachydermatis* and common dermatophytes.3-5 Chlorhexidine causes cell death through destabilization of the cell walls, leading to cell content leakage.6 It is synergistic with azole antifungals,3,7 and has been found to have residual activity on hair for 7 to 10 days.8,9

- **Azole antifungals** include miconazole, ketoconazole, and clotrimazole, and are often combined with chlorhexidine.3 Azoles inhibit the synthesis of ergosterol, a key component of fungal cell membranes, leading to impaired cell wall composition, increased cell permeability, and cell death.10 Azole resistance is a potential growing concern,11 so this topic should be monitored to determine whether it continues to be appropriate to use azoles as preventives.

- **TrisEDTA** is composed of tromethamine (Tris) and ethylenediaminetetraacetic acid (EDTA). EDTA primarily causes damage to gram-negative bacterial cell walls, facilitating drug penetration, and Tris is a buffer that enhances the effects of EDTA.4 TrisEDTA has been reported to be synergistic with chlorhexidine in the treatment of *Staphylococcus* and *Streptococcus* species,3,12 and is present in many common topical products.

- **Mupirocin** is a topical antibiotic cream. It inhibits bacterial protein synthesis and has historically been effective against localized methicillin-resistant *Staphylococcal* infections.2 However, its frequent use is no longer recommended because of increased bacterial resistance to this antibiotic and the desire to reduce the use of antibiotics generally.1,2

**DECREASE SEBORRHEA**

Seborrhea is a defect in keratinization, the end step in skin cell differentiation, that leads to increased surface scale and a greasy texture to the skin.2,13 Seborrhea is commonly accompanied by pruritus and secondary pyoderma. Antiseborrheic treatments are designed to reduce the excess greasiness and scale and to flush hair follicles to remove built up debris.13 Treatments are divided into 2 categories: keratoplastic agents, which slow skin cell turnover to reduce scale production, and keratolytic agents, which increase skin cell shedding to prevent buildup. Many treatments have both keratoplastic and keratolytic properties.13

- **Benzoyl peroxide** is a follicular flushing and keratolytic agent.1 It is metabolized to benzoic acid in the skin, which breaks the connections between cells in the stratum corneum, the outermost skin layer.1 Benzoyl peroxide can help treat patients with blocked hair follicles and severe scale, but it is also extremely drying and can cause contact reactions in some patients.2 Therefore, use of benzoyl peroxide is recommended only for a few weeks, and it should be...
followed with a moisturizing conditioner to reduce dryness.

- **Selenium sulfide** at 1% concentration is found in the human dandruff shampoo Selsun blue, as well as several veterinary shampoos. It is both keratolytic and keratolytic through interference with hydrogen bond formation by keratin in the stratum corneum.13

- **Salicylic acid** is mainly keratolytic at low concentrations (0.1%-0.2%) and gains keratolytic effects at 3% to 6% concentrations.13 Salicylic acid is often found in combination with antimicrobials in pet shampoos, so use of these products could be considered in pets with both pyoderma and seborrhea.

### CONTROL PRURITUS

The purpose of antipruritic topical treatments is to temporarily relieve mild, usually localized itching. It is crucial to also identify and treat the underlying cause of the pruritus.

- **Topical glucocorticoids** effectively reduce acute flares of local inflammation and pruritus,9,10 such as hot spots or inflammation of interdigital spaces on the paws. However, the speed of the topical and systemic adverse effects depends on the steroid and the medication vehicle,15,16 so more potent steroids include betamethasone, triamcinolone acetonide, and more potent topical steroids include mometasone, and fluticasone.15,16

### IN SUMMARY

There are so many topical products available for pets that it can be difficult to decide what to carry in a clinic. Multiuse products are usually easier to carry. Examples include combination antimicrobial/antifungal shampoos or antiseborrheic shampoos that are also moisturizing or antipruritic. If you have questions about specific products, it is always appropriate to contact your local veterinary dermatologist for their opinion and to ask the product’s manufacturer for supporting research information.

### IMPROVE THE SKIN BARRIER

Allergic patients' skin barriers are altered in many ways, so the goal of treating the skin barrier in allergy is to try to supply missing nutrients and return the barrier to normalcy.14,15

- **Ceramides** are a crucial structural component of lipids in the stratum corneum, along with several other functions, and their levels are reduced in allergic patients’ skin.15 Ceramide complexes are present in many topicals for pets, including shampoos, sprays, and mousses. They are also present in a human over-the-counter lotion, CeraVe, which can be used as an economical, easy-to-find leave-on lotion for pets with dry skin.

- **Oatmeal** is a demulcent and a humectant, meaning that it both coats the skin to retain moisture and attracts more hydration into the skin.13 It is useful for soothing irritated skin in allergic patients, or adding moisture to the skin for patients with keratinization defects or autoimmune diseases.

- **Plant extracts** used to improve the skin barrier are usually plant-derived liquids. They have been found in data from some studies to be absorbed into the skin to normalize lipid levels in allergic patients,14,15 and are available in spot-on and shampoo formulations. However, there does not appear to be a benefit to topical liquids in patients that are also receiving oral fatty acid supplementation.14

### REFERENCES


6. Ohta S. Kururuhekishin taisei-ken (skin) no taisei kika ni ko no ken (ko) ni kururuhekushin taisei kika ni ko no ken (ko) ni ko no ken. (2-pp) kururuhekishin taisei kika ni ko no ken (ko) ni ko no ken. (2-pp)


Fractured teeth are one of the most common maladies seen in our veterinary patients. These injuries range from acute fractures that cause immediate discomfort and the need for rapid intervention to chronic issues that may be incidental findings. Differentiating between the types of fractures, treatment options, and chronicity is crucial for appropriate care.

Becoming familiar with the anatomy of tooth structure is an important foundation to understanding how to best treat our patients. The outermost structure of the tooth, the enamel, is an extremely hard inorganic layer that takes the brunt of normal chewing and trauma. Immediately central to that is dentin, the most prominent layer, which is slightly softer and more porous than enamel. These outer layers protect the core of the tooth, referred to as the pulp. This central structure is what provides vitality, support, and sensation to dentition. Exposure of the pulp to the oral environment will ultimately lead to tooth death.

Uncomplicated crown fractures, or enamel or enamel-dentin fractures, are frequently found in patients during routine examination. These fractures occur in the hard outer surfaces of teeth but do not directly invade the central vessel and nerve. Although the pulp is not exposed, the involvement of the porous dentin can lead to contamination by oral bacteria and ultimately infection. In more chronic cases, the exposed dentin may become smooth and discolored, which is often indicative of a reparative process in which the tooth is making disorganized layers of dentin to help clog the paths that lead to the pulp. Uncomplicated fractures can be painful in the acute phase and may lead to chronic sensitivity.

Enamel and enamel-dentin fractures should always be evaluated with a dental radiograph. Even if probing does not confirm pulp exposure, imaging of the tooth is always indicated to look for signs of infection. Dentinal tubules are like small highways via which bacteria can penetrate the tooth to cause endodontic disease and ultimately tooth death. If no apical disease is appreciated, smoothing of the fractured surface and placement of a bonding agent can help prevent bacterial invasion and provide comfort. Care must be taken when performing this procedure so as not to inadvertently expose the pulp chamber.

Complicated crown fractures cause exposure of the pulp and can be emergent in young animals. During examination, a central red dot or bleeding from the fracture is often seen. In pets younger than 18 months, vital pulp therapy may be considered to preserve the tooth. This time-sensitive procedure allows the tooth to stay functional and alive within the mouth. The best results are seen when performed immediately after fracture and no longer than 48 hours post trauma.

In pets older than 18 months or those with more chronic fractures, root canal therapy can be considered. This procedure allows the tooth to remain as a functional portion of the mouth by disinfecting the central pulp and replacing it with an inert material. Both vital pulp and root canal therapies have a high success rate but are contraindicated in patients who cannot undergo multiple anesthetic events for monitoring. Although not the preferred treatment option, a salvage procedure to extract the tooth is often preferable in cases of root involvement, active abscessation, or tooth resorption, or in patients who should not undergo follow-up anesthesia.

Differentiating between the types of fractures, treatment options, and chronicity is crucial for appropriate care.

written by
Kirk Herrmann, DVM
(practice limited to dentistry and oral surgery)

Kirk Herrmann, DVM, obtained his veterinary degree at the University of Florida in Gainesville. He continued his education with a rotating internship at the Veterinary Specialty Center of Delaware in New Castle, and a 3-year residency at the Center for Veterinary Dentistry and Oral Surgery in Gaithersburg, Maryland. Herrmann has a strong interest in providing healthy and functional mouths for pets through surgery, interceptive procedures, and client education.

Dentistry
How to talk to clients about pet insurance

Why keeping it simple is the best approach

written by Alissa Marrapodi, Custom Content Editor

The smartest way to approach pet insurance is simply, according to the 2022 recipient of the Veterinary Heroes® Award in the category of practice management. Trying to get clients to buy into pet insurance can feel complicated, but Matt McGlasson, DVM, CVPM, chief medical officer at Noah’s Ark Animal Clinics, said that when talking with clients about pet insurance, the goal is to keep it simple.

In the latest episode of dvm360 Live™, McGlasson sat down with Adam Christman, DVM, MBA, the host and dvm360®’s chief veterinary officer, to discuss pet insurance and how to have a conversation with clients.

KEEPING PET INSURANCE SIMPLE

From the receptionist to the technician and even in the exam room, keep recommendations for pet insurance simple. “We don’t have tons of time to have a really long-drawn-out conversation with clients,” McGlasson said. “We’re really limited in the time we have, so pick 2 insurance companies that you trust and have their brochures ready in the exam room.”

Consider which insurance companies have a credible and dependable track record. In addition, think about ones you have had positive experiences with.

Pet insurance companies are making it simple for pet parents to decide on the best plan for them. Insurance companies break out plans into 2 categories: a percentage of the invoice or a benefit schedule to calculate reimbursement. From there, it is a matter of coverage (what is and isn’t covered), price, and value.

So when is the best time to talk with clients about pet insurance? McGlasson says at their first puppy visit. His clinic asks clients if they have considered what would happen if their pet had to have exploratory surgery at the emergency clinic on a weekend. “That could [cost] $5000, $6000, or $7000,” he said. Asking your clients whether they are prepared to pay that type of cost is a good first step.

“Pet insurance is just a tool for clients to get the care they want for their pet,” McGlasson pointed out. It can also help alleviate other financial concerns, even compassion fatigue, and eliminate economic euthanasia, he said.

NUMBER OF OWNERS WITH PET INSURANCE IS INCREASING

While pet insurance can help veterinarians practice medicine that works best for the patient and the pet family, the United States still only has about 2.5% of the pet population insured. “Statistics [show that] people are getting pet insurance more frequently these days, but we still have a long way to go,” McGlasson said. “We are really way behind a lot of the countries in Europe. And we know from the research that pet parents who have pet insurance are more likely to get the care that their pet needs, and they are more likely to stay with the practice long term.”

McGlasson pointed out that owners having pet insurance alleviates a lot of the stress on his staff and, again, helps them perform their job in the best possible manner.

PET INSURANCE FOR THE STARS

In the next segment Christman was joined by Chrissy Joy, a celebrity dog trainer and entertainer. She trains canines that have appeared in film, commercials, television, and print. She brought her pets Beasley, Darby, and Whidbey—who recently stared in the film Junkyard Dogs—to the set.

Joy explained that it is important for her working dogs to be insured. On top of typical puppy issues and dangers, her canines face additional challenges that make having pet insurance paramount. “They do a lot of work with me, but with that comes risk,” said Joy. “There’s travel, we do competitive sports, [and] even just going in your backyard…you just never know…so I want them to be protected.”

The smartest way to approach pet insurance is simply, according to the 2022 recipient of the Veterinary Heroes® Award in the category of practice management. Trying to get clients to buy into pet insurance can feel complicated, but Matt McGlasson, DVM, CVPM, chief medical officer at Noah’s Ark Animal Clinics, said that when talking with clients about pet insurance, the goal is to keep it simple.

In the latest episode of dvm360 Live™, McGlasson sat down with Adam Christman, DVM, MBA, the host and dvm360®’s chief veterinary officer, to discuss pet insurance and how to have a conversation with clients.

KEEPING PET INSURANCE SIMPLE

From the receptionist to the technician and even in the exam room, keep recommendations for pet insurance simple. “We don’t have tons of time to have a really long-drawn-out conversation with clients,” McGlasson said. “We’re really limited in the time we have, so pick 2 insurance companies that you trust and have their brochures ready in the exam room.”

Consider which insurance companies have a credible and dependable track record. In addition, think about ones you have had positive experiences with.

Pet insurance companies are making it simple for pet parents to decide on the best plan for them. Insurance companies break out plans into 2 categories: a percentage of the invoice or a benefit schedule to calculate reimbursement. From there, it is a matter of coverage (what is and isn’t covered), price, and value.

So when is the best time to talk with clients about pet insurance? McGlasson says at their first puppy visit. His clinic asks clients if they have considered what would happen if their pet had to have exploratory surgery at the emergency clinic on a weekend. “That could [cost] $5000, $6000, or $7000,” he said. Asking your clients whether they are prepared to pay that type of cost is a good first step.

“Pet insurance is just a tool for clients to get the care they want for their pet,” McGlasson pointed out. It can also help alleviate other financial concerns, even compassion fatigue, and eliminate economic euthanasia, he said.

NUMBER OF OWNERS WITH PET INSURANCE IS INCREASING

While pet insurance can help veterinarians practice medicine that works best for the patient and the pet family, the United States still only has about 2.5% of the pet population insured. “Statistics [show that] people are getting pet insurance more frequently these days, but we still have a long way to go,” McGlasson said. “We are really way behind a lot of the countries in Europe. And we know from the research that pet parents who have pet insurance are more likely to get the care that their pet needs, and they are more likely to stay with the practice long term.”

McGlasson pointed out that owners having pet insurance alleviates a lot of the stress on his staff and, again, helps them perform their job in the best possible manner.

PET INSURANCE FOR THE STARS

In the next segment Christman was joined by Chrissy Joy, a celebrity dog trainer and entertainer. She trains canines that have appeared in film, commercials, television, and print. She brought her pets Beasley, Darby, and Whidbey—who recently stared in the film Junkyard Dogs—to the set.

Joy explained that it is important for her working dogs to be insured. On top of typical puppy issues and dangers, her canines face additional challenges that make having pet insurance paramount. “They do a lot of work with me, but with that comes risk,” said Joy. “There’s travel, we do competitive sports, [and] even just going in your backyard…you just never know…so I want them to be protected.”
What veterinarians should know about 3 unconventional cat diets

A board-certified veterinary nutritionist explores the associated risks and potential benefits of nontraditional feeding practices

written by Bob Alaburda, Director, Custom Projects

Unconventional cat diets and feeding practices are becoming increasingly common. The results of a 2020 study show that although 90% of pet cats are offered a conventional commercial food diet, only 32% of these felines exclusively receive such diet. As the most popular unconventional diets, raw foods were offered to 53% of cats and home-prepared foods to 46% of cats. That is why Martha G. Cline, DVM, DACVIM (Nutrition), made the case that veterinary professionals should understand the risks and benefits associated with unconventional diets. She examined the nutritional adequacy of 3 popular diets and provided clinical recommendations in her session presented at the 2022 Atlantic Coast Veterinary Conference® in Atlantic City, New Jersey.

Cline began her review of vegan and vegetarian diets by referencing a study whose results showed that all commercially available vegetarian cat diets are deficient in at least 1 amino acid, and all were deficient in taurine. She added that data from the same study showed that 13 of 24 dog food diets did not meet current labeling requirements of the Association of American Feed Control Officials, casting doubt on label accuracy. In examining what it would take to formulate a nutritionally adequate vegan or vegetarian diet, Cline said, “Is it possible to formulate a diet that is vegan or vegetarian for a cat? Yes, you can absolutely do it. Then eating it might be another issue.” She later added, “…on the rare chance that you do have a client that comes in [who] is interested in this, …I would communicate this to them…emphasizing that [cats] are obligate carnivores, [and] really the literature doesn’t support that we actually have good-quality products even available for these cats.”

Cline said the desire for home-prepared diets (HPDs) can be driven by client sentiment, such as wanting to avoid additives and preservatives, wishing to enhance the human-animal bond by cooking for their pet, or simply wanting full control over their pet’s nutrition. A veterinarian can also recommend an HPD due to patient comorbidities such as chronic kidney disease or inflammatory bowel disease. “A home-prepared diet can absolutely provide complete and balanced nutrition when formulated and prepared properly,” said Cline. The problem, she continued, is that clients have many resources available for HPD recipes (eg, online, books, magazines) that vary wildly in safety and nutritional adequacy. “They can be written by people who have no nutrition training whatsoever,” said Cline. “My favorite is the Great Dane breeder in Georgia who worked as…a secretary in a law office, but in her spare time wrote diets for Great Danes.” She also cited findings from a study that examined 114 HPDs available online, and all contained nutrient deficiencies, including those written by veterinarians.

Cline recommended that general practitioners consult with a board-certified veterinary nutritionist when formulating diets for their clients. Follow-up consultations should assess adherence to the diet and check for nutrient imbalances.

1 VEGAN AND VEGETARIAN DIETS

Cline explained that raw meat–based diets (RMBDs), both commercial and home prepared, can be nutritionally adequate when formulated properly. She said the danger in RMBDs comes from antibiotic resistance and the potential presence of zoonotic pathogens, which can result in both human and animal disease.

On antibiotic resistance, she referenced a Centers for Disease Control and Prevention (CDC) study of 14 commercially available raw food products in Europe, whose results showed that 100% of samples carried enterococci resistant to erythromycin, streptomycin, chloramphenicol, and tetracycline. “The really big concern, and the reason why this study was done, is because these researchers from the CDC concluded that raw pet food could be a sentinel for emerging antibiotic resistance,” said Cline.

Cline advises that in addition to evaluating RMBDs for nutritional adequacy, veterinarians should also inform pet owners of these possible risks. The potential vectors for pathogen exposure include food utensils and bowls, litter boxes, feces, the diet itself, and cats with bacteria present in their mouths or on their coats. Individuals who are elderly, young, pregnant, lactating, or immunocompromised are at particular risk, she said.

References available online at dvm360.com

Another study analyzing 35 frozen raw meat-based diets for cats and dogs found the presence of the following zoonotic pathogens, by percentage of affected products:

- Escherichia coli serotype O157:H7: 23%
- Extended-spectrum β lactamase–producing E coli: 80%
- Listeria monocytogenes: 54%
- Other Listeria species: 43%
- Salmonella species: 20%
- Sarcocystis cruzi: 11%
- S tenella: 11%
- Toxoplasma gondii: 6%
itching eased
joy retrieved

Long-term support for their skin — and your treatment plan.

1. The only clinical nutrition for both food and environmental allergies (among leading therapeutic brands in North America)

2. Nutrition formulated to support the skin barrier against environmental irritants, year round

SCIENCE DID THAT.

©2022 Hill’s Pet Nutrition Inc.
Rabbit endotracheal intubation: Yes, you can do it (Part 1)

An expert demystifies rabbit intubation to ensure these animals can receive the same standard of care as cats and dogs.

Rabbit endotracheal intubation can be scary and challenging. However, what if I told you it is easier than you think? What if I told you the only thing preventing you from doing it is the lack of a proper tool?

If you are reading this article, chances are you are seeking a solution to a problem you already have. You want to stop losing rabbits during anesthesia. That feeling in your stomach when the nurse tells you the rabbit stopped breathing is overwhelming. Having to tell the client their pet just passed away and you are not sure what happened is soul crushing. It makes you want to give up.

I am here to show you a different perspective, in hopes that you will see a solution to your problem, one that will enable you to persist with your passion for rabbit medicine and surgery. After all, we all deserve to do what makes us happy. However, there will be a little bit of tough love first.

First things first: We need to agree that endotracheal intubation should always be the standard of care. Not intubating a rabbit patient, in my opinion, is substandard medicine and I would even go as far as to call it malpractice. I know, it sounds harsh, but you too know it to be true.

Let’s engage in a quick exercise that will allow you to see my point of view. Let’s change the word “rabbit” to the word “dog.” Imagine this was an article about anesthesia and positioning a female dog for a spay, and I try to convince you that anesthesia would be faster and easier if you just “masked the dog down” instead of taking the time to secure an airway with an endotracheal tube. “Don’t worry about intubation; dogs are known for dying under anesthesia; it is to be expected.” How would you react to that? Would you agree with me and proceed, or would you start writing a letter to the editor immediately, stating how absurd it is to have a publication recommending such a careless procedure?

Inhalant anesthesia (eg, isoflurane) is known to be hypotensive as anesthesia duration increases. We also know that ventilation will be compromised with anesthesia and positioning, even if the patient is breathing voluntarily, and will inadvertently lead to hypercapnia and hypoxemia. It is a known recipe for disaster, and we still engage in it. I will be the first to admit I have done it for years, and for years I blamed the species “rabbit” instead of my lack of skills, not to mention the health hazard of having environmental inhalant gas contamination. It didn’t even cross my mind that I could be the culprit until I lost a young rabbit during an orchietomy. This was the way I had seen it done every time by really experienced colleagues. I was just repeating something without questioning it, even in the face of bad outcomes. The point is, it is not the rabbit’s fault—it is our naïveté in expecting a different outcome.

I am also not here trying to convince you that intubating rabbits is as easy as intubating dogs. There is a learning curve, and you do need additional equipment. However, I am here to tell you it is a short learning curve, and the lack of clinical skills should not be a reason to compromise patient care.

Last, but not least, there are other variables that will dictate the success of the anesthesia, such as having intravenous access; the use of multimodal anesthesia, including blood pressure, temperature, electrocardiogram (ECG), end-tidal carbon dioxide, and partial pressure of oxygen. Now that we have established that rabbit endotracheal intubation is possible, let’s examine some key considerations.

**GENERAL CONSIDERATIONS (DO NOT SKIP ANY STEPS)**

To ensure the procedure is successful, always have all equipment ready to go and make sure you have all emergency drugs and reversals calculated—consider having glycopyrrolate, epinephrine, and reversals in predrawn syringes. Heavy sedation is highly recommended and will allow smooth placement of an -->
Do you want to learn how to care for ZooMed (exotics) pets? VETAHEAD is an immersive online experience that provides ZooMed online courses for veterinary professionals (vets, techs, assistants) and students. VETAHEAD offers affordable memberships with monthly or yearly payments, with access to **ALL** courses, current and new. All courses are RACE approved and offer CE credits!

**Course roster includes:**

- A Clinician’s Guide to Incorporating Rabbits into Your Practice: rabbit medicine and surgery (9+ hours)
- Emergency care for ZooMed (exotic) pets: from crisis to success (9+ hours)
- RITES of passage with antimicrobial stewardship (1 h)
- Coming soon (winter 2023): guinea pig and chinchilla medicine and surgery
- Coming soon (fall 2023): backyard chicken medicine and surgery

For more information on this and other services we offer, check our website: https://vetahead.vet

Follow us on social media:

- @the_vetahead
- Vetahead

Scan to learn more!
intravenous catheter and less reliance on induction agents and inhalant anesthesia. Provide preoxygenation, because it reduces the risk of hemoglobin desaturation and hypoxemia during the induction process. Always connect the patient to monitoring devices prior to intubation (eg, ECG, pulse oximeter), and have a designated person to monitor anesthesia during intubation. That person should not be doing anything else but monitoring the patient: no fetching syringes, no holding the patient. They do nothing but monitoring.

Make sure to provide proper induction of general anesthesia. This is by far one of the main reasons people have difficulty intubating. Many challenges come from a patient that is not appropriately induced (too light) and is therefore chewing and moving, and with a strong jaw tone. For this technique to work, jaw tone needs to be absent, which means in your choice of induction agent you need to take this into account. “Masking a patient down” with inhalants, as we have previously discussed, is not an appropriate induction method and will not allow proper time for intubation, especially for the untrained clinician.

I understand there is a concern about inducing the patient properly, because there is an innate risk of apnea, and we are afraid we will not be able to intubate on time if the patient properly, because there is an innate risk of apnea, and we are afraid we will not be able to intubate on time or intubate at all. The solution to this problem is simple: Always have the rabbit supraglottic airway devices available in all sizes. Those are good to have as a crutch. They are simple to place and allow you to properly ventilate the patient. They will not replace endotracheal intubation in all circumstances and can be difficult to maintain in place depending on the procedure. Therefore, it is still paramount that one becomes comfortable with intubating a rabbit patient.

On that note, it is important to highlight the need for capnography. This is the most important tool to guarantee you have properly intubated your patient, and to monitor carbon dioxide levels during the procedure. Just because a patient is breathing on their own, it does not mean they are ventilating properly, and you might need to breathe for them in cases of hypercapnia, which will allow you to have an uneventful anesthesia. In addition, when using a supraglottic airway device, capnography is a must. No skipping steps here. Lastly, I want to cover some aspects that might make you nervous in the beginning. Don’t pressure yourself to intubate in a few seconds, or even in less than a minute. If you are following all the steps and the patient is being properly monitored, you have some time. When you take a bit longer to intubate, your team might just need to repeat the induction agent titrating to effect; don’t be afraid to fail on your first attempts to intubate. I was not able to intubate the first 3 rabbits on my own. It is a learning curve for everybody and it will not be different for you. Expect failure, while guaranteeing patient safety, and do not give up.

Don’t be so afraid of laryngospasms if you are following the technique as described here. As long as you are being delicate and seeing what you are doing (we will discuss the use of an endoscope later), you should be fine. Because you can see the larynx at all times, you will be able to tell if it is becoming inflamed or edematous. Lidocaine sprayed on the larynx will also help with that.

Don’t be afraid to abort the procedure. We always pressure ourselves so much with being perfect and not failing. It is OK to abort the procedure if you must. Patient safety comes first. In the beginning, I always had this conversation in advance with the owners. Set up expectations and you will not have issues.

Finally, practice on cadavers first. The learning curve to using the equipment can be completely addressed in cadavers. That way, you will be confident and comfortable with the equipment when you have a real patient. Cadavers can be purchased (preferably from sources that acquire cadavers that were euthanized in shelters or different institutions), or you can request permission from owners when you have an euthanasia case. Set yourself up for success. Practice as much as you can on the cadavers. Become familiar with your landmarks, positioning the patient, and handling and using the scope. With all of that in place, you will be more confident and less anxious when intubating your patients.

LEARNING THE TECHNIQUE (PART 2)

I have laid out the reasoning and considerations for learning rabbit endotracheal intubation. Stay tuned for part 2 in an upcoming issue, in which we will discuss the technique, equipment, and process.

REFERENCES
One in-clinic dose of Zorbium™ provides 4 days of continuous post-op pain control

for at-home comfort.

The only FDA-approved long-acting transdermal buprenorphine for cats
Reduces the challenges of administering pain medications at home
No need to administer repeat injections or dispense buprenorphine during the critical first few days after surgery

Indication: Zorbium is indicated for the control of postoperative pain associated with surgical procedures in cats.

Important Safety Information: Before using ZORBIUM (buprenorphine transdermal solution), read the entire package insert including the Boxed Human Warning. Call 1-888-545-5973 for full prescribing information. ZORBIUM contains buprenorphine, an opioid that exposes humans to risks of misuse, abuse, and addiction, which can lead to overdose and death. The risk of abuse by humans should be considered when storing, administering, and disposing of ZORBIUM. Serious, life-threatening, or fatal respiratory depression may occur with accidental exposure to or with misuse or abuse of ZORBIUM. ZORBIUM should only be administered by veterinarians or veterinarian technicians who are trained in the handling of potent opioids. Accidental exposure to even one tube of ZORBIUM, especially in children, can result in a fatal overdose. ZORBIUM is for topical application in cats only. Following application to the cat, allow a minimum drying time of 30 minutes before direct contact with the application site. Do not administer to cats with a known hypersensitivity to buprenorphine hydrochloride, any inactive ingredients of ZORBIUM, or known intolerance to opioids. Most common adverse reactions during anesthesia were hypothermia, hypotension, and hypertension, and after anesthetic recovery were hypothermia, hyperthermia, and sedation. The safe use of ZORBIUM has not been evaluated in debilitated cats, those with renal, hepatic, cardiac or respiratory disease, pregnant lactating, breeding, in cats younger than four months old or <2.6 lbs or >16.5 lbs. Please see accompanying brief summary for additional product safety information.

Zorbium, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates.
©2022 Elanco or its affiliates. PM-US-22-0123
Zorbium™
[buprenorphine transdermal solution]

For use in cats only
20 mg/mL
For topical application in cats
Opioid analgesic:
CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.
Before using Zorbium, please consult the product insert, a summary of which follows:

HUMAN SAFETY WARNING

Abuse Potential

ZORBium contains buprenorphine, an opioid that exposes humans to risks of misuse, abuse, and addiction, which can lead to overdose and death. Use of buprenorphine may lead to physical dependence. The risk of abuse by humans should be considered when storing, administering, and disposing of ZORBium. Persons at increased risk for opioid abuse include those with a personal or family history of substance abuse (including drugs or alcohol) or mental illness (e.g. depression).

Life-Threatening Respiratory Depression

Serious, life-threatening, or fatal respiratory depression may occur with accidental exposure to or with misuse or abuse of ZORBium. Monitor for respiratory depression if human exposure to buprenorphine occurs. Misuse or abuse of buprenorphine by swallowing, snorting, or injecting poses a significant risk of overdose and death.

Accidental Exposure

Because of the potential for adverse reactions associated with accidental exposure, ZORBium should only be administered by veterinarians or veterinary technicians who are trained in the handling of potent opioids. Accidental exposure to even one tube of ZORBium, especially in children, can result in a fatal overdose of buprenorphine.

Risks From Concurrent Misuse or Abuse With Benzodiazepines or Other CNS Depressants

Concurrent misuse or abuse of opioids with benzodiazepines or other central nervous system (CNS) depressants, including alcohol, may result in profound sedation, respiratory depression, coma, and death. See Human Safety Warnings for detailed information.

INDICATION:

ZORBium is indicated for the control of postoperative pain associated with surgical procedures in cats.

DOSE AND ADMINISTRATION:

This product should only be administered by veterinary personnel.

ZORBium is for administration only once for the surgical procedure. ZORBium should be applied 1 to 2 hours before surgery. A single application provides analgesia for 4 days. ZORBium should only be applied topically to the dorsal cervical area at the base of the skull. Do not apply if dorsal cervical skin is diseased or injured. The dosage of ZORBium is 1.2 – 3.1 mg/lb (2.7 – 6.7 mg/kg) administered topically as the entire tube contents according to the following dosing table:

<table>
<thead>
<tr>
<th>Pounds of Body Weight</th>
<th>Kilograms of Body Weight</th>
<th>Dose of ZORBUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6 to 6.6</td>
<td>1.2 to 3</td>
<td>0.4 mg (8 mg) pink tube</td>
</tr>
<tr>
<td>&gt;6 to 16.5</td>
<td>&gt;3 to 7.5</td>
<td>1 ml (20 mg) green tube</td>
</tr>
</tbody>
</table>

Dose Application

Wean impermeable latex or nitrile gloves, protective glasses, and a laboratory coat to prevent direct solution contact with human skin, eyes, or mucosa when handling and applying the solution. Do not dispense ZORBium for administration at home by the pet owner (see HUMAN SAFETY WARNINGS). See product insert for complete dosing and administration information.

CONTRAINDICATIONS:

ZORBium is contraindicated in cats with known hypersensitivity to buprenorphine hydrochloride, any of the inactive ingredients of ZORBUM, or known intolerance to opioids.

WARNINGS:

HUMAN SAFETY WARNINGS:

Not for use in humans. Keep this and all medications out of reach of children and pets.

Human User Safety While Handling ZORBUM in the Hospital:

Protection Clothing: Do not come into direct contact with ZORBium. Wear impermeable latex or nitrile gloves, protective glasses, and a laboratory coat when applying ZORBium.

Mucous Membrane or Eye Contact During Application:

Direct contact of ZORBium with the eyes, oral, or other mucous membranes could result in absorption of buprenorphine and the potential for adverse reactions. If accidental eye, oral, or other mucous membrane contact is made during application, flush the area with water and contact a physician immediately. If wearing contact lenses, flush the eye first and then remove the contact lenses.

Skin Contact During Application:

Following application to the cat, allow a minimum drying time of 30 minutes before direct contact with the application site. If human skin is accidentally exposed to ZORBUM, wash the exposed area immediately with soap and water and contact a physician. Accidental exposure could result in absorption of buprenorphine and the potential for adverse reactions.

Drug Abuse, Addiction, and Diversion of Opioids:

Controlled Substance:

ZORBium contains buprenorphine, a Schedule II controlled substance with an abuse potential similar to other Schedule II opioids.

Abuse:

ZORBium contains buprenorphine, an opioid substance, that can be abused and is subject to misuse, abuse, and addiction, which can lead to overdose and death. This risk is increased with concurrent use of alcohol and other central nervous system depressants, including other opioids and benzodiazepines.

ZORBium should be handled appropriately to minimize the risk of diversion, including restriction of access, the use of accounting procedures, and proper disposal methods, as appropriate to the clinical setting and as required by law.

Prescription drug abuse is the intentional, non-therapeutic use of controlled drugs, including other opioids and benzodiazepines, for purposes other than those intended by the prescriber.

Physiological adverse reactions were defined as any single excursion outside the normal range, as defined: 100.5 – 102.5 °F body temperature; 60 – 120 mmHg mean arterial pressure; 88 – 180 beats per minute for heart rate, 24 – 44 breaths per minute for respiratory rate. A summary of adverse reactions during anesthesia (from anesthetic induction through recovery defined as final 15 minute interval during the entire duration of anesthesia).

After recovery, cats were observed in the hospital and under animal care staff supervision. Physiological changes that occurred during surgery were recorded. Urination, defecation, appetite, and daily body weights

Table 1. Adverse Reactions During Anesthesia:

<table>
<thead>
<tr>
<th>Adverse Reactions</th>
<th>ZORBUM</th>
<th>Vehicle Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradypnea</td>
<td>8 (7.1%)</td>
<td>2 (1.8%)</td>
</tr>
<tr>
<td>Dysphoria</td>
<td>20 (17.7%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Hypotension</td>
<td>50 (44.2%)</td>
<td>51 (46.8%)</td>
</tr>
<tr>
<td>Hyperthermia</td>
<td>3 (2.7%)</td>
<td>4 (3.7%)</td>
</tr>
</tbody>
</table>

*Physiological adverse reactions were defined as any single excursion outside the normal range. For additional information about reporting adverse drug reactions for animal drugs, contact FDA at 1-888-FDA-VETS or http://www.fda.gov/reportanimalae.

CONTACT INFORMATION:

Elanco US Inc.
PA102712X
Wear impermeable latex or nitrile gloves, protective glasses, and protective covering. 

**Dose Application**

**Body Weight**

**ZORBIUM** should only be applied topically to the dorsal cervical skin 1 – 2 hours prior to anesthetic induction for surgery. For intraoperative analgesia, all cats in the study received a transdermal solution of 50 mg/mL padimate O in ethanol. The dose was administered topically onto the dorsal cervical area every 4 days for a total of 3 doses. Dose-dependent euphoria, mild dysphoria, and mydriasis were observed after ZORBIUM administration. Maximum scores (for euphoria, dysphoria, and mydriasis) in the ZORBIUM groups reached 3 (mildly dysphoric) between 1 – 2 hours after the first dose. On the other 2 dosing days (Days 4 and 8), maximum scores were 2 (euphoric). Euphoria in some cats persisted from 36 to 72 hours.

For dosing day 1, mydriasis was observed in approximately half the cats. In the ZORBIUM group, 89 were treatment successes; of the 107 cats enrolled in the study, 80 were treatment successes. cats administered ZORBIUM increased above normal and were up to 1.8°F greater than the vehicle control group. Increased body temperature primarily occurred during the first 8 hours after the initial dose and was observed in the majority of cats administered ZORBIUM. Elevated temperatures ranged from 102.8°F to 104.5°F. The highest temperatures occurred at 2 hours after the first dose, gradually decreasing by 24 hours. By 3 days after dose administration, body temperatures in cats administered ZORBIUM had returned to levels observed in the vehicle control group. After the second and third doses (days 4 and 8), mean temperatures in all ZORBIUM groups were again higher than in the vehicle control group, but not higher than the normal reference range. 

**Table 3. Adverse Reactions in ZORBIUM Cats (N=113) by Day:**

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>Day 0</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoesthesia</td>
<td>16.3%</td>
<td>8.1%</td>
<td>7.1%</td>
<td>2.6%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>75.8%</td>
<td>22.1%</td>
<td>4.6%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>19.4%</td>
<td>13.2%</td>
<td>6.9%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>53.5%</td>
<td>5.4%</td>
<td>2.5%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>42.7%</td>
<td>5.1%</td>
<td>2.2%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>19.4%</td>
<td>12.8%</td>
<td>6%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>19.4%</td>
<td>1.2%</td>
<td>0.9%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>42.7%</td>
<td>14.5%</td>
<td>5.1%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>19.4%</td>
<td>7.1%</td>
<td>1.2%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Hyperthermia</td>
<td>19.4%</td>
<td>12.8%</td>
<td>7.1%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**

To report suspected adverse events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Elanco US Inc. at 1-888-545-5973.

For additional information about reporting adverse drug experience for animal drugs, contact FDA at 1-888-FDA-VETS or http://www.fda.gov/reportanimaladverse.

**EFFECTIVENESS:**

The efficacy of ZORBIUM was demonstrated in cats that underwent elective reproductive surgery in conjunction with forelim orthocystectomy in a randomized, multi-center, double-blinded, vehicle-controlled, field study across 12 investigative sites. Enrolled cats were between 4 months to 5 years of age and weighed 2.5 to 12.5 pounds (1.1 - 5.7 kg). Cats in the ZORBIUM group received a single dose of 8 mg or 20 mg of buprenorphine according to body weight (see DOSAGE AND ADMINISTRATION). Cats in the vehicle control group received a transdermal solution of 50 mg/mL padimate O in ethanol. The dose was administered topically onto the dorsal cervical area prior to anesthetic induction for surgery. For intraoperative analgesia, all cats in the study received a single intramuscular injection of an alpha,-agonist 30 minutes prior to anesthetic induction, and a 4-point metacarpal ring block with lidocaine after induction. The adequacy of pain control was scored through 96 hours after surgery. If pain control was considered inadequate at any time following treatment, rescue analgesia was provided immediately. Treatment success was defined as a cat that did not require rescue analgesia, need opioid reversal, or experience an adverse event suspected to be related to treatment through the entire 96 hour post-recovery period. Cats that was considered a treatment failure if it had inadequate pain control, required opioid reversal, or experienced an adverse event suspected to be related to treatment.

A total of 19 ZORBIUM and 63 vehicle control cats were removed from the study due to inadequate pain control. Most of these failures occurred on the day of surgery in both groups; however, there were 4 ZORBIUM group cats and 5 vehicle control cats removed due to inadequate pain control between 1 and 3 days after surgery. Effectiveness was evaluated in 219 cats (112 cats were in the ZORBIUM and 107 cats were in the vehicle control group), and field safety was evaluated in 222 cats (113 cats were in the ZORBIUM and 109 cats were in the vehicle control group). Of the 112 cats in the ZORBIUM group, 89 were treatment successes; of the 107 vehicle control cats, 42 were treatment successes. Comparison of the ZORBIUM group and the vehicle control group demonstrated a statistically significant difference in the treatment success rates (p = 0.003). 

**ADVERSE REACTIONS:**

**Twelve Day Target Animal Safety Study:** In a 12-day target animal safety study, ZORBIUM was administered to 32 healthy, four-month-old domestic cats (8 cats per group) at 0 mg/kg (vehicle control), 3.3 mg/kg (0.5X), 10.5 mg/kg (1X), 33.1 mg/kg (3X), and 100 mg/kg (10X) as a topical application to the dorsal cervical area every 4 days for a total of 3 doses. Dose-independent euphoria, mild dysphoria, and mydriasis were observed after ZORBIUM administration. Maximum scores (for euphoria, dysphoria, and mydriasis) in the ZORBIUM groups reached 3 (mildly dysphoric) between 1 – 2 hours after the first dose. On the other 2 dosing days (Days 4 and 8), maximum scores were 2 (euphoric). Euphoria in some cats persisted from 36 to 72 hours.

**Seven Day Target Animal Safety Study:** In a 7-day laboratory study, ZORBIUM was administered once topically to the dorsal cervical area of 24 healthy adult domestic cats (6 cats per group) at 0 mg/kg (vehicle control), 3.3 (0.5X), 10.5 (1X), or 30 mg/kg (4.5X) as a topical application to the dorsal cervical region every 4 days for a total of 3 doses. Continuous, direct physiological monitoring (telemetry) was conducted from 2 hours prior to the first dose through 4 days following the third (final) dose. Body temperature increases averaged <0.4°F in ZORBIUM groups cats over vehicle control cats. In the vehicle control group, 102.6°F was the maximum temperature, observed at 93 hours after the first dose. In the ZORBIUM group, 103.4°F was the maximum temperature, observed at 20 hours after the first dose. Heart rate (HR) increased an average of 15.2 beats/minute in the ZORBIUM group cats compared to vehicle control cats. The maximum heart rate in the ZORBIUM group reached 218 beats/minute. In the vehicle control group, the maximum heart rate was 218 beats/minute. Blood pressure (arterial systolic, diastolic, and mean) in the ZORBIUM group cats was not significantly different from the vehicle control cats. There were no clinically significant effects of ZORBIUM on qualitative electrocardiogram results.

**STORAGE INFORMATION:**

Store at or below 25 °C (77 °F). Excursions permitted to 30 °C (86 °F).

**HOW SUPPLIED:**

ZORBIUM is available in applicator tubes that deliver a dose volume of 0.4 mL or 1 mL (20 mg/mL buprenorphine) in multi-packs of 10 tubes.

Approved by FDA under NASA # 141-547

Manufactured for:
Elanco US Inc.
Greenfield, IN 46140 USA
ZORBIUM, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates.
© 2021 Elanco or its affiliates

Rev. Date 02/2022
Many individuals use medications for various diseases and conditions of the brain. Unfortunately, our dogs and cats sometimes get into our pharmaceutical supply and suffer the consequences. In fact, over 30% of calls received by the helpline involve exposures to human medications and supplements, many of them psychotropic, according to Renee D. Schmid, DVM, DABT, DABVT, manager of veterinary medicine and professional services and senior veterinary toxicologist at Pet Poison Helpline, a division of SafetyCall International.

Dogs corner the market on pharmaceutical poisonings at about 65% of cases, she added, while presenting a lecture at the 2022 Fetch dvm360® Conference in Kansas City, Missouri. Although feline cases account for only one-third as much of this amount, Schmid warned attendees that they should not be counted out. “Cats really love the taste of these medications,” she said.

But whether it be in cat or dog, decontamination is rule number one in a toxic situation. For ridding either animal of most toxins, however, emesis is only effective within an hour of ingestion.

Safety should be kept in mind, Schmid noted. “It’s instinctive for us, when an animal has ingested something, to try to get it back out. But when that animal is lateral recumbent, or when it’s bouncing off the walls, it is not a candidate for inducing vomiting,” she said. Furthermore, each class of psychiatric medication has its very own toxic stamp and specific recommended fix.

ADHD DRUGS

Medications used to treat attention-deficit/hyperactivity disorder (ADHD) are ubiquitous in American households. According to the Centers for Disease Control and Prevention (CDC), over 60% of children aged 2 to 17 years with an ADHD diagnosis are using medication to treat the condition. ADHD drugs fall into a few different categories: stimulants, α-2 adrenergic agonists, and selective norepinephrine reuptake inhibitors (SNRIs).

Stimulants

Prescription stimulants are used in children and adults to address ADHD, narcolepsy, and occasionally obesity. These include amphetamines and methylphenidate preparations. Like many psychiatric medications, these generally come in immediate-release (IR) and extended-release (ER) versions. To ease administration, particularly in children, formulations other than the standard oral tablet are available. These include patches, as well as tasty chews, solutions, powders, and beads. The flavorings, which may incorporate xylitol, render them appealing to pets.

In dogs and cats, amphetamines are generally toxic at 1 mg/kg (0.8 mg/kg for ER formulations). Methylphenidates are toxic at 0.5 mg/kg. Clinical signs of stimulant intoxication stem from central nervous system (CNS) excitement and sympathomimetic agonism: agitation, hyperactivity, vocalization, tachycardia, hypertension, head bobbing, tremors, seizures, mydriasis, and hyperthermia.

A pet that has ingested an IR formulation can experience clinical signs within 20 to 30 minutes that may persist for 12 to 24 hours. “If the animal is asymptomatic after 3 to 4 hours, it probably did not actually get into the medications,” said Schmid. For ER formulations and ingested patches, onset of signs may be delayed by 4 to 6 hours, and clinical effects can last a day or two.

The first step in treating these pets is decontamination. If the animal is neurologically appropriate, emesis should be induced. Chewable and oral disintegrating products are absorbed very quickly, leaving little time to induce emesis. If a dog or cat has ingested an IR product and lives far away, the owner should induce vomiting prior to transporting the pet to the hospital.

For ER products, metabolism is slower, and decontamination can be performed with slightly less urgency. So...
JUST DROP IT.

Clevor®
(ropinirole ophthalmic solution)

When dogs eat something potentially poisonous or harmful, you need to act quickly. Clevor is a selective emetic with a fast onset of action and short duration of vomiting. A convenient, single-use dropper provides one injectionless treatment for a dog.

Clevor - a new way to induce emesis in dogs.

CLEVOR® is indicated for the induction of vomiting in dogs.

IMPORTANT SAFETY INFORMATION: Do not use in dogs with central nervous system depression or seizures. Do not use in cases of ingestion of sharp foreign objects, corrosive agents (acids or alkalis), volatile substances or organic solvents. CLEVOR® should not be administered in cases with corneal ulceration, ocular irritation, or ocular injury. Do not use when there is a known sensitivity to ropinirole or the inactive ingredients. ADVERSE REACTIONS MAY INCLUDE: Transient mild or moderate hyperemia of the eye, ocular discharge, protrusion of the 3rd eyelid and blepharospasm, transient mild lethargy and increased heart rate. Not recommended for use in breeding, pregnant or lactating dogs. CLEVOR® has not been evaluated in dogs with heart or liver impairments or dogs younger than 4.5 months or less than 4 pounds. Dopamine antagonists, neuroleptics and other medicines with antiemetic properties may reduce the effectiveness of ropinirole. CLEVOR® should be administered by a veterinary professional. Gloves and protective eyewear should be worn when administering. Not for use in humans. Keep out of reach of children.

For additional product safety information, see brief on following page or visit: https://www.vetoquinolusa.com/clevor-info

CLEVOR® is a trademark of Orion Corporation Orion Pharma. It is developed and manufactured by Orion Corporation Orion Pharma and distributed by Vetoquinol USA, Inc. under license from Orion Corporation Orion Pharma.

CVR-0003-IORTRN 1/2022 v2
if an animal that has swallowed ER drugs lives near the clinic, emesis usually can be delayed until it arrives. “Time is on our side,” Schmid said.

If a patient is neurologically intact, attempts to scavenge any remaining drug can be made by feeding the animal activated charcoal. But once clinical signs have set in, most of the drug will have been absorbed and activated charcoal will not be very effective.

Schmid also addressed the hazards of drug patches. “Dogs do like to ingest patches,” she said.

Unfortunately, the majority of the drug is still active long after patches are discarded. A dog that has swallowed one may exhibit significant clinical signs that last until the patch is completely gone.

Patch removal can be achieved via endoscopy or by feeding the animal multiple meals until the patch has been expelled. Activated charcoal can be administered to asymptomatic animals experiencing tremors, and anticonvulsants such as phenobarbital or levetiracetam can address seizures.

A-2 adrenergic agonists

Guanfacine and clonidine are α-2 adrenergic agonists that act centrally to modulate the symptoms of ADHD in children and adults. Clonidine is also used for autism, Tourette syndrome, and insomnia in humans, and to treat behavioral issues such as phobias and separation anxiety in dogs.

These drugs have a narrow margin of safety in pets, and clinical signs—which include depression, sedation, ataxia, vomiting, bradycardia, hypotension, tremors, and seizures in dogs—can develop in doses as low as 0.01 mg/kg to 0.02 mg/kg. Onset occurs within 4 hours of ingestion, and effects can persist for 24 to 72 hours.

Emetics (within 30 minutes of ingestion) and activated charcoal can be administered to asymptomatic patients. If the patient is symptomatic, the α-2 adrenergic antagonist atipamezole (50 mcg/kg IM, redosed as needed) can be used to reverse signs of poisoning. (Anticonvulsants are indicated in the rare case of seizures.) IV fluids should be given to maintain blood pressure, perfusion, and hydration. Vital signs, particularly heart rate, must be monitored frequently.

Selective norepinephrine reuptake inhibitors

Atomoxetine, a nonstimulant SNRI used as a second-line treatment for ADHD, can cause sedation or agitation and anorexia at low doses in dogs and cats. It can also cause hypertension, tachycardia, and tremors at high doses.

Treatment is with emesis induction for recent ingestion, followed by a single dose of activated charcoal.
Charcoal. Further support may include sedation for agitation, antiemetics for nausea or vomiting, β-blockers for persistent tachycardia, methocarbamol for tremors, and IV fluids for cardiovascular support.

**ANTIDEPRESSANTS**

Some 25 million American adults have experienced a major depressive episode in the past few years, according to the CDC. The population most affected—at a rate of 21%—are those aged 18 to 29 years.2 This is important, said Schmid, because “a lot of times, [these patients may not store medications in their original packaging or] may leave medications lying around, increasing the ability of their pets to get to them.”

**Selective serotonin reuptake inhibitors**

Used in both people and pets to address anxiety-based behaviors, selective serotonin reuptake inhibitors (SSRIs) bathe the CNS with “feel-good” serotonin by blocking its reuptake in the presynaptic membrane.1,4 Common SSRIs include fluoxetine, citalopram, escitalopram, paroxetine, and sertraline. Trazodone, although not a true SSRI, also blocks serotonin reuptake to produce a calming effect.

The toxicity profile for SSRIs varies by species, with cats being more sensitive than dogs.3 Small overdoses of 2 to 3 times the therapeutic dose result in sedation or agitation, tachycardia, vomiting, mydriasis, tremors, and hyperthermia. Larger overdoses can cause ataxia, dysphoria, aggressive behavior, nystagmus, and seizures. Amounts that are even greater may produce serotonin syndrome. This is important, said Schmid, because “a lot of times, [these patients may not store medications in their original packaging or] may leave medications lying around, increasing the ability of their pets to get to them.”

**Tricyclic antidepressants and other agents**

Like SSRIs, tricyclic antidepressants (TCAs) can combat depression and anxiety in both humans and animals.4 Common TCAs include amitriptyline, clomipramine, nortriptyline, and doxepin.

TCAs differ from SSRIs in their narrow margin of safety:1 Overdoses produce anticholinergic effects: constipation, urine retention, mydriasis, hypertension, tachycardia, and disorientation. Vomiting, seizures, and serotonin syndrome may also result.

Toxicities involving bicyclic antidepressants, venlafaxine, and serotonin, and other SNRIs such as duloxetine, cause sympathomimetic effects, similar to those seen with SSRI intoxication. Toxicities associated with TCAs, bicyclics, and SNRIs are treated similarly to cases of SSRI overdose; for TCA overdoses, careful cardiovascular monitoring is also advised.

**BENZODIAZEPINES AND NONBENZODIAZEPINE SLEEP AIDS**

Benzodiazepines are effective anxiolytics, anticonvulsants, muscle relaxants, and sedatives; 3 nonbenzodiazepine hypnotics induce sleep in individuals whose brains fight it.7 Both benzodiazepines and nonbenzodiazepines operate through the inhibitory neurotransmitter γ-aminobutyric acid (GABA).1,4

Benzodiazepines used in humans and in veterinary medicine include alprazolam, diazepam, midazolam, and clonazepam.7 Nonbenzodiazepine hypnotics include zolpidem, eszopiclone, and zaleplon.7 Of these, clonazepam and zolpidem account for the most Pet Poison Helpline calls.

Because of the wide safety margins of benzodiazepines and nonbenzodiazepines, poisonings rarely cause fatality in animals.6,7 Clinical signs of acute toxicity, occurring within 30 to 60 minutes after ingestion, are vomiting, ataxia, disorientation, and either sedation or paradoxical CNS stimulation. In cats, chronic oral use of diazepam can lead to hepatic failure, although acute exposures do not carry the same risk.6

Treatment for these overdoses is much the same as that for the other psychotropics: decontamination and supportive care. If paradoxical agitation occurs, sedation can be achieved with acepromazine or butorphanol. In rare cases of severe CNS or respiratory depression, the antidote flumazenil (0.01 mg/kg IV, as needed to effect) can reverse signs.

The dietary supplement 5-hydroxytryptophan has become popular for inducing sleep, enhancing mood, and promoting a sense of well-being. As it is an OTC medication, Schmid explained, “owners think it’s safer and won’t be a problem for pets.” Nonetheless, she warned of this serotonin precursor’s narrow margin of safety in dogs and cats: At just 3 mg/kg—a single 100-mg capsule in a medium-sized dog—agitation, tachycardia, hypertension, vomiting, diarrhea, and transient blindness can occur within 2 to 4 hours of consumption. Treatment is by decontamination, IV fluids, sedation, cyproheptadine, methocarbamol, and maropitant citrate.

**BIPOLAR DISORDER MEDICATIONS**

Lithium, lamotrigine, and antipsychotic drugs such as olanzapine, risperidone, aripiprazole, and ziprasidone are used to treat bipolar disorder in humans. Like other drugs, they sometimes end up in canine and feline stomachs.

Signs of overdose vary with the compound, but generally encompass lethargy, hypotension, heart rhythm disturbances, tremors, and seizures. Acute overdoses of lithium are well tolerated, with only lethargy, mild vomiting, and anorexia.1

Management is by decontamination, supportive care, and medications to address each clinical sign. For lamotrigine overdose, cardiovascular function should be monitored closely and any ventricular arrhythmias treated.

**TAKEAWAY**

How each case of poisoning is managed depends on the compound, formulation, ingested amount, and time elapsed following consumption of the agent. However, the epidemic of psychological drug toxicities in pets can only be reined in by client education regarding the safe storage of medications.

---

References available online at dvm360.com
The neurologic exam and neurology in general can be an intimidating subject for some. “Neurophobia is a real thing because the things that make [neurology] sexy and cool are also the things that make it scary,” said Fred Wininger, VMD, MS, DACVIM (Neurology). That is why Wininger aimed to demystify the neurologic exam during his sessions at the 2022 Fetch dvm360® Conference in Kansas City, Missouri.

LOCALIZATION, LOCALIZATION, LOCALIZATION

Wininger began by stating that the ultimate goal of the neurologic exam is neurolocalization. By analyzing a patient’s gait, reflexes, and responses, the clinician is able to ascribe the problem to a specific part of the anatomy and thereby run down a list of differential diagnoses. In short, once you know where the problem is, you can begin to narrow down exactly what the problem is. Wininger said, “…if you know where the problem is, and you get some general data about signalment, onset, progression, and the presence of pain, then you just open a book and I promise you the answer will be there.”

According to Wininger, the neurologic exam consists of analyzing the animal’s gait, proprioception, spinal reflexes, pain sensation, and performing spinal palpation. This article will focus on gait analysis and its implications for neurolocalization.

GAIT, NEUROLOGIC ABNORMALITIES, AND NEUROLOCALIZATION

“I learn more from watching a dog walk than I do from doing anything else,” said Wininger. “In fact, I’ve had to modify my exam to make it more interactive because the technical staff thought that I wasn’t doing a thorough physical examination, because I knew what was wrong with the dog before I even touched it.” Here are 6 gait abnormalities and what they may reveal about where the problem lies.

1. Ataxia

Ataxia is a lack of coordination that can result in swaying, a wobbly gait, head tilt, and other possible clinical signs. Wininger said a number of different anatomic lesions can cause these issues, but are most commonly of the cerebellum, vestibular system, and spinal cord sensory pathways. Often spinal/proprioceptive ataxia is coupled with paresis (weakness) whereas cerebellar or vestibular ataxia does not.

2. Dysmetria

Dysmetria is impaired flexion whereas hypermetria is hyperflexion. These patients are often described as “goose-stepping” or “prancing like a pony.” This would imply a lesion of the cerebellum.

3. Spasticity

Spasticity is a state of abnormally increased muscle tone and/or stiffness for a “loss of inhibition” by the brain. These patients are often thought of as overreaching with an increase length of stride. Wininger said the limbs are overly straight and that it is typically associated with upper motor neuron lesions.

4. Stiffness

Stiffness implies muscle rigidity and can emanate from many sources. If the limb is not easily bent there is tetany, as often seen in dogs that contract tetanus. Stiffness can also be from spasticity or pain causing a reluctance to bend the joints.

5. Paresis

Paresis is muscular weakness, often characterized by a short stride, and inability to maintain posture or joint extension. Wininger said: “Paresis is a motor dysfunction that can make it difficult to generate gait. Paresis can be caused by both upper and lower motor neuron disease, essentially anything that blocks messaging between the brain and the muscles of the limb.

6. Lameness

Lameness is the inability or reluctance to bear weight on a limb. Wininger said this can be the result of pain from musculoskeletal disease or due to nervous system dysfunction. He noted this problem can occur in a single thoracic limb due to spinal compressive disorders, such as intervertebral disk extrusion.

REFERENCE

FOR PET OWNERS NOTICING
JOINT DISCOMFORT IN
THEIR DOGS,

EVERY DAY

MAKES A
DIFFERENCE

Recommend Dasuquin® Advanced, now with proprietary NMXEM70™ EGG SHELL MEMBRANE!

The joint support you trust is now enhanced with peptides from proprietary NMXEM70™ partially hydrolyzed egg shell membrane, which has been shown to help provide a quick response in joint comfort and function.

Order now from your Nutramax representative, authorized distributor, or visit vet-ez-order.com.

Visit WWW.DASUQUIN.COM.

#1 VETERINARIAN RECOMMENDED SUPPLEMENT COMPANY®

*Source: Survey conducted among small animal veterinarians who recommended animal supplements.
Improving outcomes with pyometra and PU surgeries in primary care

Uterine infection and urethral obstruction are life-threatening conditions that can be expensive to treat, but new research results indicate positive outcomes after surgery in primary care setting.

As new drugs and more advanced technologies have entered the veterinary world, the level of care that can be offered to companion animals has increased dramatically. Unfortunately, so have the costs. Because financial constraints are the most common barrier to pet care,1 most veterinarians practice along a spectrum, that is, “a continuum of acceptable care that considers available evidence-based medicine while remaining responsive to client expectations and financial limitations.”2 Nevertheless, there are barriers to practicing along such a spectrum, and they include communication problems, fear of judgment and of poor outcomes, and lack of evidence supporting alternative treatments.

As part of a movement to improve access to care, some veterinary groups are working to provide scientific evidence for treatment plans that are not the current gold standard. At the 2022 American Veterinary Medical Association Convention in Philadelphia, Pennsylvania, Margaret Slater, DVM, PhD, senior director of research at the American Society for the Prevention of Cruelty to Animals (ASPCA), presented results from several studies that investigated outcomes of perineal urethrostomy (PU) and pyometra surgeries performed in primary care hospitals.

**FELINE PERINEAL URETHROSTOMY**

According to Slater, urethral obstruction (UO) in cats is “a fatal disease that we can fix.” Since the development of therapeutic urinary diets, feline PU has been considered a salvage procedure for cats that block repeatedly. Although the surgery does not treat the underlying disease, it does minimize recurrence of UOs, which are painful, life-threatening, and costly. Gold standard UO medical management includes catheter placement, multiday hospitalizations for fluid therapy, and long-term dietary management, which may cost hundreds to thousands of dollars. “It may not be that much more costly to take them to surgery,” Slater pointed out.

A retrospective study of 74 cats that underwent PU surgery at the nonspecialized ASPCA Animal Hospital in New York City between September 2015 and July 2017 looked at preoperative history and postoperative outcomes and quality of life (QOL).1 According to Slater, the most common reason why cat owners chose surgery was failure of medical management, but the cost of unblocking was a consideration for many.

All owners reported feeling that postoperative QOL was at least as good as preoperative QOL, and 48% felt that postoperative QOL was better. All rated QOL at 7 or more on a scale of 1 to 10, and 75% gave it a rating of 10.

“If quality of life is good and cats won’t block again, then we need to offer surgery sooner,” Slater stated. The lives of cats whose owners cannot afford repeated unblocking and hospitalization can be saved if owners can opt for surgery before their cats’ third UO episode, which they cannot now do. Slater noted that PU surgery requires good surgical skills and is not without risk but that it can be successfully—and economically—performed in general practice.

**CANINE AND FELINE PYOMETRA**

Pyometra is a common emergency presentation in older, unspayed dogs and cats. The gold standard treatment for this infection is same-day surgery (after a full preoperative workup) and postoperative hospitalization. This approach is not feasible for all owners, who are left with bad choices: euthanasia or delays while they explore less expensive treatments. “This is a curable disease that [individual’s] pets are being euthanized for,” Slater emphasized.

The ASPCA has published a number of studies that evaluate the outcomes of pyometra surgeries performed on dogs and cats in nonspecialized settings.3,7 One retrospective study compared outcomes in a referral hospital to those in an outpatient community clinic.4 Of the 133 dogs studied, 83 had surgery in a specialty setting and 50 at a community clinic. Patient presentation, including size, age, and clinical signs, was not significantly different between the populations. Overall, 97% of pets survived to discharge, and 94% remained alive 1 week after surgery. The place where the surgery was performed did not affect survival. Dogs presenting to the community clinic often had a longer wait (up to 14 days), were treated as outpatients, and were operated on by students or interns. None of these factors had an impact on survival to discharge.

The same 97% survival rate was found in a retrospective study of 406 dogs treated with ovariohysterectomy at the ASPCA Animal Hospital in New York, New York, between January 2017 and February 2019.5 These dogs were hospitalized postoperatively, but there were some treatment delays because 57% of them had been seen by a veterinarian before being referred to the ASPCA hospital, most likely owing to procedure cost. Although there are less data about cats, 100% of the 134 cats undergoing pyometra surgery at the ASPCA hospital survived to discharge.6

The findings of these studies support the fact that although surgery should ideally be performed as quickly as possible, very good outcomes can still be seen in nonspecialized settings for dogs and cats.6,4

**TAKE-HOME POINTS**

As the body of literature grows and provides support for the spectrum of care, veterinarians in general practice can feel more comfortable about pursuing alternative treatments. Patients undergoing pyometra and PU surgery in these facilities have good outcomes. PU surgeries could be considered sooner for cats that have repeated obstructions, especially if owners don’t have the resources for continued hospitalization. Short delays in surgical treatment and/or outpatient care can still result in good outcomes for dogs and cats with pyometra.4

References available online at dvm360.com
Celebrating National Veterinary Technician Week

Two credentialed technicians share what they love about their career and the veterinary industry

Written by Megan Manzano, Senior Editor, Custom Projects

Alongside every veterinarian is a veterinary technician to help care for our pets. Using their technical and scientific knowledge, they assist with tasks such as taking a medical history, preparing instruments and pets for surgery, performing laboratory procedures, grooming, and much more. In honor of National Veterinary Technician Week (October 16-22), the latest episode of dvm360 Live!™ featured Michael Lark, CVT, and Deena Torres, CVT, LVT, veterinary technicians with Banfield Pet Hospital. They sat down with Adam Christman, DVM, MBA, the host and dvm360®’s chief veterinary officer, to share insights into their field, the current scope of the industry, and how Banfield supports their needs and careers.

CONTRIBUTING AS A VETERINARY TECHNICIAN

Lark and Torres emphasized that patients are at the forefront of why they return to the hospital every day. “I think I speak for anyone who owns a pet that pets are like your family member,” said Lark, who cannot recall a time in his life when he did not own a pet. As bonds form with patients and clients, they work with their team to provide high-quality care for pets.

This quality is critical as there is a higher demand for veterinarians and veterinary technicians. To help meet the demand, technician appointments have grown within the industry over the past few years. Doctors can focus on patients that are sick or have underlying problems, while technicians can focus on the wellness components of a visit. “...I want to be utilized to my fullest capacity,” said Torres. “Everything the doctor wants me to do, I always want to meet expectations.”

GROWTH AND CAREER PATHS

Becoming credentialed and maintaining their education allows veterinary technicians to continue to support veterinarians. If technicians are licensed in multiple states, they must know the differing laws for each one. Banfield helps their technicians by providing online resources and textbooks for anything they need a refresher on. They also help cover costs for their exams. Whether someone has a lot of experience or is just starting out, there is support to expand on skills critical for the job.

Technicians may advance their careers by taking on a supervisory role or by obtaining specialized certifications. They then have a more hands-on working relationship with doctors. “[Banfield] encourages us to take on different roles, and whatever we feel comfortable in doing.... As vet techs, we could specialize in surgery.... We could also advance to being field directors; we could be practice managers,” Torres said. These career milestones add to the scope of being a veterinary technician.

However, it can be a challenge to find a job with a work-life balance and one with a safe environment for advocacy. Torres describes herself as a mom and a wife. Lark emphasizes the value of a positive and safe space as someone who is part of the LGBT and Black community. Both technicians believe they have found the animal hospital for them with Banfield’s accommodating nature for scheduling—for example, when something happens and you need to pick the children up from school—and emphasis on creating an inclusive workplace.

ADVICE FOR FELLOW TECHNICIANS

Being an integral part of the veterinary team, and bringing constant compassion to those they work with, can be stressful. At the end of the day, remembering why they became veterinary technicians keeps Lark and Torres motivated. “...We’re here for the pets. And it’s always very rewarding to come in every day at work and help these doctors at work and help these families,” said Lark.

Torres praised fellow technicians in the field for all the effort and hours put into loving their patients. “What we do, no one else does.... It’s rough at times, and it’s fulfilling most of the time. And we all love it.” With this attitude and resilience, pets everywhere are in great hands with veterinary technicians.
Oncology myths

Experts debunk common misconceptions in veterinary oncology
Most masses in patients younger than 12 months of age are nonneoplastic

This is considered semantics to some veterinary practitioners and academic to others, but that approach is technically very inaccurate. In a recent study by Kim et al, 2554 histopathologic samples were submitted from dogs younger than 12 months of age. In total, 2408 of 2554 (94.3%) were neoplastic. Of those, 2212 of 2408 (86.6%) were considered benign neoplastic and were interpreted as histiocytoma.1 Veterinarians often do not understand and/or document the difference between benign masses (eg, cyst, viral, hyperplasia, granuloma), benign neoplastic masses, and malignant neoplastic masses and/or appropriately communicate this information to pet owners.

Neoplasia simply means new, abnormal growth; it does not indicate a benign or malignant process. For a cell to become neoplastic, it develops mutations that allow it to no longer obey that boundary of local cells, thus allowing uncontrolled growth. To classify as a benign neoplastic mass, the abnormal cells stay in 1 place vs a malignant neoplasm, where the cells can metastasize. Although many histiocytic tumors can spontaneously regress and not need surgical recommendations (eg, cyst, viral, hyperplasia, granuloma), benign neoplastic masses and/or document the difference between benign masses and surgical recommendations.

Pathologists use the Kiupel grading system (low vs high grade) and/or the Patnaik grading system (I, II, III) for cutaneous mast cell tumors (MCTs). Patnaik grade I and most grade II MCTs are considered low grade per the Kiupel grading system. Patnaik grade III is considered high grade in the Kiupel grading system. The grade is associated with metastatic potential.

As reported by Simpson et al in 2004, 2-cm margins lateral and 1 fascia plane deep are recommended for cutaneous MCTs. Patnaik grade I and most grade II MCTs are considered low grade per the Kiupel grading system. Patnaik grade III is considered high grade in the Kiupel grading system. The grade is associated with metastatic potential.

The Kiupel and Patnaik grading systems cannot be applied to MCTs that are confined to the subcutaneous space (SQ). SQ MCTs that are completely restricted to the fat do not have a grading system. Moreover, there have yet to be published studies to document the recommended margins. However, most surgeons still have the goal of achieving as close to 2 cm lateral and 1 fascia plane deep for margins.

In general, most subcutaneous MCTs have a favorable prognosis, with extended survival times (84% alive at 1500 days), low rates of reoccurrence (2%), and low metastatic rates (6%). Thompson et al concluded that SQ MCTs were more effectively controlled by surgery alone (98%) compared with cutaneous MCTs.1,4

Agreement between cytologic findings and histopathologic findings is usually at least 75%

According to Cohen et al in the Journal of the American Veterinary Medical Association in 2003, complete agreement between cytology and histopathologic diagnosis was 37.9% (102 of 269), with complete disagreement in 32.7% (88 of 269) of cases. When insufficient cytologic samples were removed from submission, there was 42.7% complete agreement.2 These results contrast with previously published studies by Eich et al and Vos et al, which had sensitivity of 89%/95.6% and specificity of 100%/65.4%.4,7 The key difference is that the cytologic samples for these reports were obtained during surgery or postmortem and not in awake, moving patients.

The cytology slides should be assessed prior to submission to reduce the chance of rejection because of low cellularity, cell degeneration, hemodilution, and/or artifacts. At least 1 slide should be assessed in-house before submission. In addition, multiple locations within a mass should be aspirated to increase the odds of obtaining an accurate diagnosis.6

REFERENCES
You may be a newly graduated veterinarian or looking toward finishing your fourth year of veterinary school. Your sights turn to landing that first job. You are nearing the finish line after 8 years of advanced education, long nights, nerve-racking tests, tears, and pure grit. As you await the results of your North American Veterinary Licensing Examination, you field contacts from recruiters and suggestions from classmates, professors, and family as you weigh the plethora of options for that first position.

The veterinary job landscape has changed dramatically over the past 20 years. At one time, the veterinary industry feared there would be too many veterinarians for the positions available. Veterinary schools were urged to decrease class sizes, and postings for jobs were minimal. Along with the dour prediction of not enough positions, the salary for both new and established doctors of veterinary medicine (DVMs) was reported to be in the mid-5 figures. Upon graduation, a veterinarian was considered lucky to have at least 1 job offer.

Times have certainly changed. Job offers for soon-to-be-graduated veterinarians now often come in the third year or sooner. You may also be “promised” to a veterinary hospital after working there prior to veterinary school or during required clinicals, summer externships, and preceptorships. The job market for veterinarians is white hot, which creates multiple opportunities yet still requires professionalism from applicants.

As someone who has interviewed and hired thousands of veterinarians over the past 27 years, from experienced DVMs to new graduates, I offer a few tips in this important process as you search for your first job after graduation.

**PREPARE**

Prepare a curriculum vitae (CV) or résumé; although the grab for veterinary graduates is intense now, it is still important to have a well-prepared CV or résumé. There are many templates online and professional résumé preparation services. In addition, many schools offer help in resumé preparation. Why is this important? First, it presents your full professional career, even if it is primarily school, to prospective employers. You should highlight the roles you have held prior to and during veterinary school. You should demonstrate that your work supported the
business, as opposed to just taking the role to satisfy clinical rotation for a grade. Second, preparing a CV or résumé speaks to your professionalism and helps you keep track of your roles through the years.

BE PROMPT AND PROFESSIONAL

Respond promptly to recruiters for veterinary positions if you are contacted, regardless of your level of interest. Nowadays, it has become commonplace to delay responding to, or worse yet to “ghost,” professional contacts. You may be inundated with recruiter contacts, postcards, and emails about prospective roles, but it is imperative to comport yourself as a professional. If you are contacted by email for a job in which you have no interest, sending a short email in response to that effect is mandatory. If you are contacted by phone and receive a voice mail about a position that may not be a fit, it is important to also respond to that caller. Why is this important? The veterinary profession is very small. The adage of “don’t burn any bridges” really applies to the job hunt process today. Although there is a plethora of positions to choose from, this could change; worse, the person you ghost may be friends with someone at the hospital where you really want to work. Reputation matters. Treat everyone as you would wish a family member to be treated.

INTERVIEW PROCESS: VIRTUAL AND IN PERSON

The interview process today is a bit different than that of previous eras. The COVID-19 pandemic has brought in the use of virtual meetings in some settings. This is very true in the hiring process. You may meet virtually with a recruiter first prior to scheduling with the actual hiring manager. It is important to treat that recruiter respectfully, as they will determine whether you pass to the next level.

1. Be on time for the virtual interview. Log on 3 to 5 minutes before the meeting is to start. You can turn off the camera until 1 minute before. And yes, your camera should be on the entire time.

2. Confirm that you have downloaded the platform that the meeting planner will use. There are many electronic platforms and you must have the proper app downloaded beforehand, otherwise you may be late to the meeting.

3. Dress for the part. Although many of us have become used to dressing from the waist up for virtual meetings, you must fully dress for a job interview online. Dressing as if you were in person will affect how you present yourself. In addition, there are horror stories of people forgetting they were not appropriately dressed from the waist down and getting up or reaching for something only to reveal pajama bottoms or worse. Be professional even when no one else can see it.

4. As you would in an in-person interview, allow the interviewer to lead the conversation. Smile during introductions and make sure to thank them for their time and express your interest in the role.

Protect canine synovial joints before significant damage occurs.

Prescribe FDA-approved Adequan® Canine (polysulfated glycosaminoglycan) at the first clinical signs of canine osteoarthritis (OA).

Using a disease-modifying osteoarthritis drug (DMOAD) prevents further joint damage and may help:

- **Restore** joint lubrication
- **Relieve** inflammation
- **Renew** the building blocks of healthy cartilage

Visit adequancanine.com to discover if Adequan® Canine is right for your patients.

Adequan® Canine brand of polysulfated glycosaminoglycan (PSGAG)

INDICATIONS Adequan® Canine is recommended for intramuscular injection for the control of signs associated with non-infectious degenerative and/or traumatic arthritis of canine synovial joints.

IMPORTANT SAFETY INFORMATION Adequan® Canine should not be used in dogs who are hypersensitive to PSGAG or who have a known or suspected bleeding disorder. It should be used with caution in dogs with renal or hepatic impairment. Adverse reactions in clinical studies (transient pain at injection site, transient diarrhea, and abnormal bleeding) were mild and self-limiting. In post approval experience, death has been reported in some cases; vomiting, anorexia, depression/lethargy and diarrhea have also been reported. The safe use of PSGAG in breeding, pregnant or lactating dogs has not been evaluated. Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

For additional safety information, please see Full Prescribing Information at adequancanine.com.

Adequan and the Dog Head design are registered trademarks of American Regent, Inc. © 2022, American Regent, Inc. PP-AC-US-0348 08/2021

T. Adequan® Canine Package Insert, Rev 1/19.
5. Remember that movements on video are more pronounced than in person and the frame is small. Keep hand and head movements to a minimum. Try to be somber free of distractions and noise. However, pets traipsing through are endearing and very well tolerated within our profession. Be aware of the delay on video and wait until the other person finishes speaking before responding.

6. As with any interview, have questions prepared about the position. These could include questions on hospital operations, such as how many technicians work with each doctor, whether schedules are posted prior to each month, or how the doctors collaborate in the hospital. As a newly graduated veterinarian, you would want to discuss the mentorship process in that hospital. Write your questions down beforehand and take notes as the interview progresses for others that come to mind.

7. Ask for next steps at the end of the call. What should you expect next? If the first call is with a recruiter and you pass muster, they should plan to schedule you to meet with the hiring manager of the business. It is OK to ask when you can expect to hear back. Recruiters and hiring managers know new graduates will have multiple offers and interviews. They will want to be prompt and efficient with your time. If your time is limited due to clinics or other work, you may mention the best days and times to set the next call to prevent the back and forth in scheduling.

8. Be courteous at the end of the call. Smile and thank them again for this opportunity. Even if you have no interest in the role, thank them for their time and let them know you found it helpful to hear more about the position and hospital.

9. Make sure you disconnect at the end of the call before making any comments or facial expressions or speaking to someone else. A great interaction can be negatively affected if a poorly timed frown or comment is seen or heard at the call ends.

10. Follow up. It is always appropriate to send a follow-up email. Make sure to send such a communication to the recruiter and hiring manager. This should be done within 24 hours of the meeting. You may wonder whether you should do this if you have no interest in the position, and the answer is a resounding yes. Never burn that bridge, as you never know whether your paths will cross again nor who your interviewer may know. There is no harm in being gracious.

11. Next steps would be an in-person meeting. You will want to see the facility and meet the team. Plan to arrive the day before to prevent potential travel delays or cancelations. Take 2 professional business casual outfits, just in case. Before traveling, confirm if the trip will be reimbursed and how reimbursement will be handled so you know to retain your receipts. Ask beforehand whether a face mask is required.

12. You are being observed from the moment you arrive in the parking lot. Comport yourself well when walking to the door. Copies of résumé in a portfolio are still appreciated. Smile, introduce yourself, and always greet the staff. Shake hands when proffered (this varies with COVID-19), demonstrate confidence by making eye contact, and wait to be escorted to the meeting area. Greet all staff on the hospital tour.

From here, the interview process will be very similar to the virtual meeting. A “thank you for meeting with me” is appropriate here, as well. Seat yourself comfortably, refrain from crossing your arms, take notes, and be attentive. Ask questions and show interest in their business. Complimenting the team, hospital layout, and facility will go a long way in endearing you to the hiring manager.

Written offers should be reviewed, and choice of employment based on your professional and personal needs; these can include location, mentorship, benefits, and pay, among others. When accepting a job offer, do so by email or phone call. When declining an offer, do so by phone call. Do not ghost.

Your first job will help set the tenor of your career and development. Being professional from initial contact to offer acceptance requires attention to detail at every step. Lastly, be intentional and fully present to enjoy this exciting time in your personal journey and career.

HIRING IS A 2-WAY STREET

As a new graduate, you will have many offers for your first position. The job market for veterinarians is expected to grow by 17% through 2030, according to one source. Another source estimates the growth in veterinary jobs to be 19% between 2016 and 2026, an additional 15,000 jobs in that decade. This portends well for all veterinarians, but specifically for newly graduated DVMs. Most can have multiple job offers months before graduation. Do not miss out these opportunities as a license to behave inappropriately toward any prospective employer. Offers can be rescinded and poor reputation travels quickly.

Your job hunt should be handled professionally from the initial contact throughout the entire interaction. The process will culminate in an important decision that requires your attention to detail at every step. The beginning phase outlined here describes the importance of CV or résumé preparation, the initial contact by recruiters, and your interaction and interview as a candidate. The offer and acceptance phase are equally important, if not more so.

REFERENCES
Introducing Barrier® (imidacloprid + moxidectin) Topical Solution for Dogs and Cats -- a low-cost generic Advantage Multi® designed to make you money and your clients happy.

Barrier is the once-a-month topical solution for the prevention of heartworm disease your clinic has been requesting. Besides proven heartworm prevention, Barrier economically treats:

- Problematic circulating microfilariae
- Adult fleas and flea infestations
- Sarcoptic mange
- Intestinal parasite infections in dogs and cats

And with Aurora’s Best Price Always commitment, your clinic will always be the best-priced option for your pet owners.

For more information call 1-800-345-1793 or visit: www.aurorapharmaceutical.com

Barrier is a Registered Trademark of Aurora Pharmaceutical, Inc. Advantage Multi® is a Registered Trademark of Bayer.
**Barrier® for Dogs and Cats**  
**imidacloprid + moxidectin**  
**Topical Solution**

**BRIEF SUMMARY:** Before using Barrier for Dogs (imidacloprid + moxidectin) or Barrier for Cats (imidacloprid + moxidectin), please consult the product insert, a summary of which follows:

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

**Barrier® for Dogs:**

**WARNING**

- **DO NOT ADMINISTER THIS PRODUCT ORALLY.**
- For the first 30 minutes after application ensure that dogs cannot lick the product from application sites on themselves or other treated animals.
- Children should not come in contact with the application sites for two (2) hours after application.  
  (See Contraindications, Warnings, Human Warnings, and Adverse Reactions for more information.)

**INDICATIONS:**

 Barrier for Dogs is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis* and the treatment of *Dirofilaria immitis* circulating in heartworm-positive dogs. Barrier for Dogs kills adult fleas and is indicated for the treatment of flea infestations (*Ctenocephalides felis*). Barrier for Dogs is indicated for the treatment and control of *sarcotic mange* caused by *Sarcoptes scabiei var. canis*. Barrier for Dogs is also indicated for the treatment and control of the following intestinal parasites species: Hookworms (*Ancylostoma caninum*) (*Uncinaria stenocephala*), Roundworms (*Toxocara canis*) (*Toxascaris leonina*) and Whipworms (*Trichuris vulpis*).  

Barrier for Cats is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis*. Barrier for Cats kills adult fleas (*Ctenocephalides felis*) and is indicated for the treatment of flea infestations. Barrier for Cats is also indicated for the treatment and control of ear mite (*Otodectes cynotis*) infections and the intestinal parasitic species Hookworm (*Ancylostoma tubaeforme*) and Roundworm (*Toxocara cati*). **Ferrets:** Barrier for Cats is indicated for the prevention of heartworm disease in ferrets caused by *Dirofilaria immitis*. Barrier for Cats kills adult fleas (*Ctenocephalides felis*) and is indicated for the treatment of flea infestations in ferrets.

**CONTRAINDICATIONS:** Do not administer this product orally. (See WARNINGS). Do not use the Dog product (containing 2.5% moxidectin) on Cats.

**WARNINGS:**

Barrier for Dogs: For the first 30 minutes after application: Ensure that dogs cannot lick the product from application sites on themselves or other treated dogs, and separate treated dogs from one another and from other pets to reduce the risk of accidental ingestion. Ingestion of this product by dogs may cause serious adverse reactions including depression, salivation, dilated pupils, incoordination, panting, and generalized muscle tremors. In avermectin sensitive dogs*, the signs may be more severe and may include coma and death*.  

Barrier for Cats: Do not use on sick, debilitated, or underweight cats. Do not use on cats less than 9 weeks of age or less than 2 lbs. body weight. Do not use on sick or debilitated ferrets.  

**HUMAN WARNINGS:** Not for human use. Keep out of the reach of children. Dogs: Children should not come in contact with the application sites for two (2) hours after application. Cats: Children should not come in contact with the application site for 30 minutes after application.

Causes eye irritation. Harmful if swallowed. Do not get in eyes or on clothing. Avoid contact with skin. Wash hands thoroughly with soap and warm water after handling. If contact with eyes occurs, hold eyelids open and flush with copious amounts of water for 15 minutes. If eye irritation develops or persists, contact a physician. If swallowed, call poison control center or physician immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or physician. People with known hypersensitivity to benzyl alcohol, imidacloprid, or moxidectin should administer the product with caution. In case of allergic reaction, contact a physician. If contact with skin or clothing occurs, take off contaminated clothing. Wash skin immediately with plenty of soap and water. Call a poison control center or physician for treatment advice. The Safety Data Sheet (SDS) provides additional occupational safety information. For a copy of the Safety Data Sheet (SDS), to report adverse reactions, or consumer questions call Aurora Pharmaceutical at 1-888-215-1256.

**PRECAUTIONS:** Do not dispense dose applicator tubes without complete safety and administration information. Use with caution in sick, debilitated or underweight animals. The safety of Barrier for Dogs has not been established in breeding, pregnant, or lactating dogs. The safe use of Barrier for Dogs has not been established in puppies and dogs less than 7 weeks of age or less than 3 lbs. body weight. Barrier for Dogs has not been evaluated in heartworm-positive dogs with Class 4 heartworm disease.  

Cats may experience hypersalivation, tremors, vomiting and decreased appetite if Barrier for Cats is inadvertently administered orally or through grooming/licking of the application site. The safety of Barrier for Cats has not been established in breeding, pregnant, or lactating cats. The effectiveness of Barrier for Cats against heartworm infections (*D. immitis*) after bathing has not been evaluated in cats. Use of this product in geriatric cats with subclinical conditions has not been adequately studied. Ferrets: The safety of Barrier for Cats has not been established in breeding, pregnant, and lactating ferrets. Treatment of ferrets weighing less than 2.0 lbs. (0.9kg) should be based on a risk-benefit assessment. The effectiveness of Barrier for Cats in ferrets weighing over 4.4 lbs. (2.0 kg) has not been established.

**ADVERSE REACTIONS:** Heartworm Negative Dogs: The most common adverse reactions observed during field studies were pruritus, residue, medicinal odor, lethargy, inappetence and hyperactivity.  

Heartworm Positive Dogs: The most common adverse reactions observed during field studies were cough, lethargy, vomiting, diarrhea (including hemorrhagic), and inappetence. Cats: The most common adverse reactions observed during field studies were lethargy; behavioral changes, discomfort, hypersalivation, polydipsia and coughing and gagging. Ferrets: The most common adverse reactions observed during field studies were pruritus/scratching, scabbing, redness, wounds and inflammation at the treatment site; lethargy; and chemical odor.

For a copy of the Safety Data Sheet (SDS) or to report adverse reactions call Aurora Pharmaceutical, Inc. at 1-888-215-1256 or www.aurorapharmaceutical.com.

Ad000167 07/2022  
Approved by FDA under ANADA # 200-714 and ANADA # 200-718  
MANUFACTURED BY:  
AURORA PHARMACEUTICAL, INC.  
NORTHFIELD, MN 55057  
www.aurorapharmaceutical.com  
MANUFACTURED IN U.S.A.  
Barrier is a trademark of Aurora Pharmaceutical, Inc.
4 ways to advance as a veterinary technician or assistant

Learn how to grow your career and improve your earning potential

Veterinary technicians and assistants are essential elements of any veterinary care team. Techs and assistants help deliver care to patients, often acting as the first line of contact for pets and their owners. Although the role of the veterinary technician can be highly rewarding, job satisfaction levels are wavering. Turnover rates have increased in the past few years, with many technicians pursuing a different role after just several years. This article highlights 4 veterinary technician advancement opportunities to help:

• Expand your skills
• Increase your earning potential
• Boost career satisfaction
• Lay the groundwork for advancing into leadership roles

1. EARN YOUR CREDENTIALS

Currently, only 18 states certify veterinary technicians. If you are working in a state that doesn’t require credentials, that shouldn’t stop you from aiming to become a certified, registered, or licensed veterinary technician. Earning your certified veterinary technician, licensed veterinary technician, or registered veterinary technician credential shows your commitment to delivering outstanding care.

Earning your credentials goes beyond the letters after your name. The experience and education you receive to become credentialed are invaluable to your role, and the amount of knowledge behind the skills you know may astound you. In a veterinary technology program accredited by the American Veterinary Medical Association Committee on Veterinary Technician Education and Training, you will learn core skills on a broad range of topics that equip you with the knowledge required as a vet tech, including essential nursing skills, medical terminology, laboratory procedures, radiology, and more.

You’ll be prepared to sit for the Veterinary Technician National Examination (VTNE), which is required in most states to become credentialed. Once you are a certified, registered, or licensed veterinary technician, you can continue honing your skills and growing professionally with growth opportunities such as these:

• Pursuing further credentials
• Being promoted to a supervisory role within your hospital
• Attaining a training or teaching role in a hospital or academic institution
• Joining hospital administration and management roles that support technicians and assistants
• Obtaining various roles in veterinary pharmaceutical, laboratory, and nutritional companies

2. GO BEYOND YOUR CREDENTIALS

Becoming a credentialed veterinary technician is an accomplishment to be proud of. After the work you put in to graduate from a veterinary technology program, pass the VTNE, and become credentialed in your state, your accomplishments should be celebrated.

Passing the VTNE and earning your credentials may seem like the end goal for a veterinary technician, but this time can be just the starting point for your future.
depending on your professional goals and aspirations. Credentialed vet techs have many possible paths for advancement, depending on what interests you and ignites your passion.

**Become a veterinary technician specialist**

If you have an affinity for a particular veterinary discipline, such as emergency and critical care, internal medicine, or anesthesia and analgesia, you can advance your career and follow your passion by earning a veterinary technician specialist (VTS) certification in your desired specialty.

**Why become a VTS?**

Earning a VTS certification signifies your deep commitment and devotion to the profession and your desire to continue growing and advancing your role. This can lead to even more opportunities and earning potential in the future. VTS is an in-demand, high-growth career that allows you to enjoy job security and the professional satisfaction of performing a higher level of skills and duties to help animals.

**What is NAVTA?**

The National Association of Veterinary Technicians in America (NAVTA) has a list of approved academies that have met the NAVTA Committee on Veterinary Technician Specialties requirements to become fully recognized credentialing bodies for VTS certification. The academies cover veterinary disciplines such as: emergency and critical care, internal medicine, anesthesia and analgesia, nutrition, and more. These academies are responsible for credentialing and uniting technicians in their specific veterinary specialty.

**How do I earn a VTS certification?**

If you are interested in obtaining your VTS, the first step is gaining the experience needed for your specialty. Many specialty academies require proof of more than 1000 hours of experience in the specialty as part of your application for certification. Often, this includes materials such as case logs and summaries that detail your nursing skills and knowledge.

As you gain the necessary experience, sign up for specialized continuing education (CE) opportunities, which you can find on academy websites and NAVTA.net, among other places. Talk to your supervisor about your desire to earn a VTS certification. They may be able to help you identify CE opportunities and place you in a role in which you can gain the skills and knowledge needed to apply.

In summary, to be eligible to take the exam and earn a VTS certification, you will need the following:

- On-the-job experience
- Case logs and reports
- Specialty CE credits
- Support and mentorship from a fellow VTS or board-certified clinician

The requirements for each academy may differ slightly, so be sure to check NAVTA’s list of approved academies to learn more about your specific discipline’s eligibility needs.

**3. PURSUE A LEADERSHIP ROLE**

Leadership and supervisory positions within a hospital are a natural progression for many veterinary paraprofessionals looking to advance in their careers. Leadership roles in nursing (eg, technician supervisor or technician manager) or in administration (eg, practice manager or hospital administrator) are an excellent way to progress in your career and foster important changes, such as developing resources to support patient care team associates at your workplace.

**Show your dedication**

If you are inspired to lead, find opportunities to make your commitment, initiative, and skills known to leaders in the hospital. This can take many forms, such as:

- Being an active participant in team meetings
- Mentoring new technicians and assistants
- Researching relevant CE sessions for your team
- Learning business acumen
- Studying leadership philosophies and styles

**Demonstrate your capabilities**

By proactively seeking ways to flex your newly acquired skills, broadening your scope of responsibilities, and enabling your team to make unique contributions, you will lay the foundation of success for transitioning into a leadership role in the future. You can also ask your manager about available opportunities to hone your leadership skills, such as the following:

- Volunteering to help with supervisory tasks
- Providing ideas for improving processes in your hospital
- Sharing your knowledge and skills with others
- Demonstrating your ability to be a team player

Consider asking directly: What skills do I need to have for the leadership position I aspire to?

**4. SEEK MORE KNOWLEDGE**

**Education**

In addition to the CE credits needed to maintain your license set by your state, participating in internal or external CE credit hours every year gives you a chance to learn about new advancements in the field, hone your skills, and acquire new, diverse skill sets that can benefit your career progression and leadership journey.

Take advantage of scholarship opportunities provided by your company when possible to pursue your credentials and advance your education. If your goal is to become a VTS, look into CEs featuring your specialty of interest. If you are aiming for a leadership position, seek CEs that focus on management, business, and administration skills to gain experience and demonstrate your commitment to success.

**Training**

Participating in training opportunities sponsored by your company—such as the Reassessment Campaign on Veterinary Resuscitation and cardiopulmonary resuscitation refresher courses—is one way to maintain your knowledge and stay up-to-date with current field requirements and hospital procedures.

**Development**

You can also lean on educational platforms to find CE opportunities approved by the Registry of Approved Continuing Education program. Many have options for leadership development, career advancement, and sessions specific to specialties, procedures, and treatments. For self-guided instruction and learning, find out what kind of medical library your organization has access to. This way, you can access primary veterinary medicine journals and stay current on industry news and research.

**Achieve your goals as a vet tech**

Wherever you aspire to take your career as a veterinary technician, these resources can help you build your skills and grow professionally. Whether you want to upskill and improve your caregiving abilities or become a VTS, the most important thing you need is a willingness to learn, try something new, and stick to your goals.

Reference available online at dvm360.com
IMPORTANT SAFETY INFORMATION: VETMEDIN is for use in dogs with clinical evidence of heart failure only. The most common side effects reported in field studies were poor appetite, lethargy, diarrhea, dyspnea, azotemia, weakness, and ataxia. VETMEDIN should not be given in case of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons. For more information, please see full prescribing information.

**VETMEDIN® (pimobendan)**

Chewable Tablets

Cardiovascular disease (CVD) can be a frightening disease for pets, owners, and veterinarians. VETMEDIN, a vasodilator and diuretic, is indicated for the treatment of congestive heart failure (CHF) due to atrioventricular valvular insufficiency (AVVI) or dilated cardiomyopathy (DCM). VETMEDIN is indicated for use with concurrent digoxin therapy for congestive heart failure (e.g., heart rate control) in dogs with AVVI or DCM. VETMEDIN tablets are available for dogs weighing between 5 and 36 kg.

**Dosage and Administration:**
VETMEDIN (pimobendan) is indicated for use with concurrent digoxin therapy for congestive heart failure (e.g., heart rate control) in dogs with AVVI or DCM. VETMEDIN is used daily in dogs weighing over 5 kg to effect a final dose of 0.5 mg/kg of body weight, using a suitable combination of tablets and active metabolite tablets if necessary. Tablets are available in 1 mg, 0.5 mg, and 0.25 mg strengths. Tablets and active metabolite tablets are scored and the calculated dosage should be provided as either five 0.5 mg tablets or one 1 mg tablet for dogs weighing 5 to 10 kg, or two 0.5 mg tablets or one 1 mg tablet for dogs weighing over 10 kg.

**Contraindications:**
VETMEDIN should not be used in dogs with a hypersensitivity to pimobendan, PDE III inhibitors, or any other chemical entity known to cause cardiovascular collapse in dogs for functional or anaphylactic reasons.

**Warnings:**
Dogs with CHF and clinical evidence of heart failure. At 3 and 5 times the recommended dosage, administration of the dosage forms at the corresponding time period, pimobendan caused an increased heart rate, increased systolic blood pressure, and increased respiration rate in normal dogs instrumented with left ventricular (LV) pressure transducers, pimobendan increased LV systolic and LV diastolic pressure, LV filling pressure, and cardiac output in normal dogs instrumented with LV pressure transducers.

**Adverse Reactions:**
Clinical findings in the field study were consistent with those seen in the 13-week study in normal dogs, and included increased water consumption, increased urination, vomiting, diarrhea, melena, weight loss, lethargy, respiratory rate, coughing, gagging, pleural effusion, fever, mucopurulent nasal discharge, diarrhea, skin rash, squamous metaplasia, and pruritus. Treatments were associated with clinical signs of heart failure. A total of 57 dogs exhibited one or more of these signs.

**Animal Safety:**
VETMEDIN tablets were administered to 8 healthy New Zealand White rabbits to determine whether the drug is toxic to rabbits. Administration of 4 mg/kg pimobendan by intravenous injection caused death of all 8 rabbits within 5 minutes of injection. At 2 mg/kg, all rabbits died within the first 5 minutes, and at 1 mg/kg, all rabbits died within the first 5 minutes and 30 seconds. At 0.5 mg/kg, 6 rabbits died within the first 5 minutes and 30 seconds. Of the remaining 2 rabbits, 1 died at 5 minutes and 30 seconds and one died at 6 minutes and 30 seconds. At 0.25 mg/kg, 4 rabbits died within the first 5 minutes and 30 seconds, and 2 rabbits died within the first 5 minutes and 30 seconds. All rabbits died within the first 5 minutes and 30 seconds at 0.1 mg/kg. At 0.05 mg/kg, all rabbits died within the first 5 minutes and 30 seconds. At 0.025 mg/kg, all rabbits died within the first 5 minutes and 30 seconds. All rabbits died within the first 5 minutes and 30 seconds at 0.01 mg/kg. At 0.005 mg/kg, all rabbits died within the first 5 minutes. All rabbits died within the first 5 minutes at 0.0025 mg/kg. At 0.00025 mg/kg, 2 rabbits died within the first 5 minutes and 30 seconds. At 0.0001 mg/kg, 1 rabbit died within the first 5 minutes and 30 seconds. At 0.0000025 mg/kg, all rabbits survived. The rabbit is the most sensitive species to pimobendan. Toxicological data from the rabbit study provide no basis for extending these findings to dogs, which are more sensitive to the toxic effects of pimobendan than rabbits. Therefore, concentrations of pimobendan that are not toxic to rabbits might be toxic to dogs. It is not known whether rats and dogs are equally sensitive to the toxic effects of pimobendan. Therefore, concentrations of pimobendan that are not toxic to rats might be toxic to dogs. It is not known whether dogs are equally sensitive to the toxic effects of pimobendan as rats and rabbits.

**How and when to start paying back student loans?**

**The $1 million question: Should you save or pay off debt?**

It can be a struggle to decide whether to save money or pay student debt. The answer is that you should do both as much as possible. Most veterinarians are coming out of school owing hundreds of thousands of dollars that were lent to them by the government or a private lender. Taking on debt is not a bad thing, as most people would suspect, because the main reason you took it on was to further your education. Imagine if you had enough cash when starting veterinary school that you could choose whether or not to borrow money. It is quite an uplifting and empowering feeling. Not many people have this luxury, so they must rely on student loans to get them through school.

The average veterinarian salary in 2020 was $99,250. Based on the amount you borrowed during undergraduate and veterinary school, your debt could be from 4 to 6 times your current or starting salary. This all depends on where you live and what type of veterinary medicine you plan to practice. What if I told you that you were a millionaire by taking out these loans? You probably just rolled your eyes or asked, “How?” Well, you may not be a millionaire right now, but let’s take a look at your future earning potential. Based on the salary we just discussed, someone who works a 30-year career with an average pay increase of 4% each year would earn over $5.7 million. Think about that. You borrowed $200,000 but will earn 28.5 times the amount you borrowed over your career. This is a huge deal. Debt is frowned upon because of payments and interest, so many people will get tunnel vision and make eliminating it their top priority. If your goal was to repay the debt in 10 years and you had enough income, but during that period you would save very little, what would you do? This is the dilemma so many veterinarians get to choose. The one thing I know for a fact is that we cannot get back time. The question I like to ask people is: Can you tell me with absolute certainty that you will be able to start saving money after paying off your debt? This is a difficult question.
to answer, but the answer is no. None of us know what our lives will look like in a month, 3 months, 1 year, or even 10 years from now. When the priority is placed on repaying debt, we are sacrificing the certainty that we can achieve other goals in life, along with eventually having the choice to not work forever.

We should always start with trying to become a world-class saver. This means we are saving 20% of our gross income (salary and production before taxes and deductions). Sometimes this can be difficult right out of the gate because there are other responsibilities, but the focus should always be to save money. Ideally, we would build up a minimum 3-months’ emergency fund that would be determined from our expenses. The rest of your savings needs to be directed toward buckets that are accessible. Retirement accounts, such as 401ks and individual retirement accounts, are a big draw because people constantly feel behind the 8 ball with retirement savings. The problem is that these accounts come with restrictions and penalties when accessed before a certain age.

If saving is difficult for you, take a step back and create a spending plan. The reason I use the term spending plan instead of budget is because budgets are for those who really struggle with spending, and the goal is to create strict boundaries. A spending plan is meant to create awareness and provide the ability to pivot spending when needed or wanted. We need to establish a baseline on what we are spending. This includes all the fixed expenses, such as rent, electricity, and car payments, and all variable expenses that can be adjusted, such as groceries, eating out, entertainment, and shopping. Once this baseline has been created, we can learn where there is flexibility to redirect spending to save and pay off debt.

So, let’s talk about paying off debt. First, look at all your debt as one big picture. We want to find out the total balance with the average interest rate. There are calculators available online to figure this out. Second, use a time value of money calculator to plug in the balance and the interest rate. We need to understand how much money is required each month to repay the debt back over multiple periods. This could be 25 years, 15 years, 10 years, or sooner. After we understand what payment is required, this can then help us understand what period to choose and is possible to repay so we can become realistic with our repayment plan. Once the repayment plan is chosen, it is vital to stick to that plan and keep paying back the loans. You can reevaluate the repayment plan every 12 months, but you need to place the emphasis on saving money. Every 3 to 12 months, you can decide whether any of that extra money that has been saved should be put toward debt or allocated toward your plan to one day not have to work forever.

Let’s summarize:
1. Create a baseline of your spending, including fixed and variable expenses.
2. Calculate the required monthly payment for different periods based on the entire debt balance and average interest rate.
3. Start saving 20% of your gross income (or as much as possible).
4. Begin to pay back loans based on a realistic period and do not spontaneously change it.
5. Every 3 to 12 months, reevaluate whether you want to put extra cash toward debt.

The plan is simple to understand, but the implementation is where many people have challenges. If you need help, make sure to reach out to someone who can show you how to create these behaviors and maintain them long term. 😊

REFERENCE
A little over 15 years ago, Will Coleman, DVM, and his husband, Chris Frendreis, decided they were tired of cold Colorado winters and their long-distance relationship from Denver to Steamboat Springs, so they began searching for a new place to live. They were considering Hawaii, scheduled a trip, and fell in love with the state as soon as they arrived. While preparing to move to Oahu, Coleman noticed that there was only one 24-hour veterinary practice on the island and determined to open another.

“When I moved here, there was 1 ophthalmologist…and a…surgeon who would come into your general practice and do…surgery for your general practitioner…and there were no other specialists in the state. Well, at least on this island. There were a couple of other semiretired specialists that were, I think, doing more general practice, but it was tough,” Coleman explained in an interview with dvm360.

“I felt like I took a big step back in time moving here from Denver and suddenly didn’t have specialized [veterinarians],” he added. “Our goal was to…bring it back to the state-of-the-art…[profession] that veterinary medicine has grown into.”

To fill this need, Coleman, Frendreis, their business partners, Erika Sox, DVM, DACVIM, and her husband, Graham Burns, DVM, DACVR, opened the Veterinary Emergency + Referral Center (VERC), the first 24-hour emergency and specialty hospital in Hawaii. After later being purchased by Ethos Veterinary Health, they built this hospital, covering 17,250 square feet, offering many services: emergency, critical care, diagnostic imaging, internal medicine, interventional radiology, neurology, oncology, and surgery. There are 17 veterinarians on staff, and 6 or 7 are usually seeing patients simultaneously.

VERC is also gaining attention for its design, having received the dvm360® Hospital Design Competition award in the more than 8000 square feet category during the 2022 Fetch dvm360® Conference held in Kansas City, Missouri, this past August.

INSIDE THE HOSPITAL

The design

The lobby is welcoming, with refreshments and separate seating for canine and feline patients, and the hospital has 14 exam rooms, which feature portraits of employees’ pets to “bring a little cheer to the staff,” Coleman said, adding that “I like to point out my dog when I’m in the exam room where his picture is.” He also thinks it’s “calming to the clients to see such a clean and beautiful design,” with windows in the lobby and many exam rooms.

There are 4 surgery suites—2 for orthopedics and neurology and 2 for soft-tissue—connected

Photo by DeBaiko Photography, LLC
The **First and Only In-Clinic Free T4 (fT4) Assay** to Help Diagnose Canine Hypothyroidism – with Confidence

The TRUFORMA in-clinic complete thyroid diagnostic panel of fT4, tT4 and TSH provides accurate, precise results with the convenience of point-of-care testing.

### Total T4 (tT4)
- Screening Test
- tT4 alone cannot confirm hypothyroidism
- If within normal range, helps rule OUT hypothyroidism

### TSH
- 24%-30% of hypothyroid dogs may have normal TSH\(^1,2\)
- TSH alone cannot confirm or rule out hypothyroidism

### Free T4 (fT4)
- Less affected by illness, drugs & antibodies
- Low fT4 with clinical signs supports diagnosis of hypothyroidism

---


---

The **TRUFORMA In-Clinic Biosensor Testing Platform** delivers an expanding array of assays to help veterinarians diagnose a range of challenging cases with confidence.

- Compact design.
- Simple Process.
- Minimal Training.
- Fast results.

Make clinical decisions faster—and begin treating patients sooner—with **TRUFORMA**

---

**Ask us how you can receive a TRUFORMA device with no capital outlay through our Customer Appreciation Program.**
by a sterile corridor and semisterile induction area. The enclosed intensive care unit is located at the center of the hospital and contains everything patients need to recover, including wet and dry treatment tables, caging and runs, and a charting area. VERC also has a 128 slice CT and the only MRI on the island and what they refer to as their “Bat Cave,” a room dedicated to radiology reading. The isolation suite for infectious animals has a negative pressure vestibules to prevent the spread of disease, and staff can observe patients through the windows and via an audio and video monitoring system.

**Patient and staff comfort**

Coleman’s objective was to have shared workspaces for easy collaboration and better patient care. At their first hospital in Hawaii, there had been a lot of wasted space, and the staff worked in tight quarters. Although they expanded to about 6000 square feet, “everybody…[was]…on top of each other…and hallways…didn’t flow well,” he said, which “added a lot of stress.” Along with shared spaces, VERC also designed a spacious, quiet, and welcoming break room where employees can have coffee and espresso and snacks and lunch.

**CONCLUSION**

Coleman and his team wanted to fill a veterinary need on Oahu. They thought out the hospital’s design carefully and now treat pets to the best of their abilities while hoping to expand the staff to provide even more services. Winning an award was an unexpected honor. “[I]t’s kind of a dream come true,” Coleman said, adding that he had sought to bring “something new to Hawaii…a place that not only provided great care for the patients, but a great work environment for staff, and…where clients could be comfortable and trust that they’re getting the best care. It’s an honor,” he concluded, “I’m very proud to receive the award.”

Currently, Coleman and Sox no longer serve as the medical directors for the hospital, but the duo and Sox’ husband Graham still practice at VERC.
Bonds you can count on
Our genetic screening tools enhance your insights, client connections and practice success.

Pragmatic • Predictive • Powerful
Basepaws provides you with actionable genetic screening tools that keep you on the front lines of science and medicine. These evidence-based results allow you to give your patients preventive care that’s as unique as their DNA.

• basepawsvet.com •
See how Basepaws can take your care up a molecular level.
Why you should add genetic testing to your practice

Today’s pet parents want personalized care

As veterinarians, the life-altering power of the human-animal bond is something we have always appreciated, and numerous recent studies have confirmed this phenomenon for the rest of the world. Ninety-five percent of pet owners now consider their pet a part of their family, and 87% of pet owners report that they have personally experienced the mental and/or physical health benefits of the human-animal bond. Today’s pet parents want the absolute best care possible for their loved ones, and it’s important to deliver that care by utilizing the most up-to-date information available to us. We must continue to advance how we render care to effectively meet the changing needs of our clients.

EARLY DETECTION IS VITAL

Genetic testing, in some form, has been available in human medicine for decades and has been instrumental in early detection of many treatable diseases. Perhaps the most familiar example is the now routine genetic testing for hereditary breast and ovarian cancer caused by mutations in the BRCA1 and BRCA2 genes. Individuals who are identified as having these mutations while still free of clinical disease can make proactive decisions with their health care provider to decrease their future cancer risk.

The great news is that we finally have the technology at our fingertips in veterinary medicine that is affordable, accessible, and that allows for the early detection of many life-altering conditions in our pets. A shift from reactive to proactive medicine is what is needed to allow pet parents to partner with their trusted veterinarian to provide the absolute best care possible. Early detection of risk factors can have lifesaving results in your patients.

ELEVATE YOUR WELLNESS VISITS

In the past, a veterinary wellness visit was a chance to update vaccinations, prescribe parasite prevention, and provide a physical exam. Over the years, that has evolved to often include laboratory tests such as blood chemistries, complete blood count, and urinalysis. In some cases, radiography, ultrasonography, and other imaging modalities are performed. However, what if there was an easy and affordable way to provide our pet parents with even more personalized care? With genetic testing, now we can.

By combining a physical exam and screening lab work with genetic testing, we are now able to provide our clients with a comprehensive and predictive picture of their pet’s current health, as well as note risk factors for future conditions we can potentially address in a proactive manner. Educating our clients to help them better understand genetic testing is the first step. You may have already been
asked about DNA testing by your clients. When many clients think of genetic testing for their pets, the at-home tests that give information about dog and cat breeds likely come to mind. Although genetic testing that provides details about a dog or cat’s specific breed makeup is interesting and can even offer some insight into breed-related conditions, the genetic testing platforms that are available today for veterinarians provide much more specific, relevant, and actionable information about a pet’s health.

Current tests can screen for numerous conditions in both dogs and cats. For example, the Basepaws Feline Breed and Health DNA test screens for genetic mutations associated with clinically relevant medical conditions, including dilated cardiomyopathy, multidrug resistance mutation, epilepsy, von Willebrand disease, bleeding disorders, and ocular conditions such as retinal degeneration, polycystic kidney disease, urolithiasis (bladder stones), and many more. The Basepaws Feline Breed and Health DNA test + Oral Microbiome-Dental Disease screens for genetic mutations in 64 health markers associated with clinically relevant conditions, including hypertrophic cardiomyopathy (HCM), polycystic kidney disease, retinal degeneration, progressive retinal atrophy, pyruvate kinase deficiency of erythrocytes, and many more. In addition, the oral microbiome test screens over 600 relevant microbes and reveals risk for periodontal disease and tooth resorption. A risk score for feline gingivostomatitis will soon be included in upcoming reports.

EXAMPLES IN PRACTICE

We can all agree that this technology is promising, but how do these tests fit into your general veterinary practice? Seamlessly incorporating these diagnostics into your wellness visits can benefit your patients, clients, and your practice.

For example, a 1-year-old feline patient presents to your practice for an annual wellness visit. The client reports no concerns at home. After a thorough physical exam reveals no abnormalities, you discuss lab work (chemistry, complete blood cell count [CBC], and urinalysis), as well as the Basepaws genetic test. Your veterinary technician obtains a blood and urine sample and takes a quick swab inside the patient’s cheek. These samples are sent to the lab for processing.

The chemistries and CBC are all normal. However, the results of the Basepaws genetic test show this particular feline carries one of the mutations associated with a higher risk of developing HCM. We know most cats with HCM are not diagnosed before clinical signs are present, and at that point, the disease process may be too advanced to provide long-term quality of life.2 After discussing the results and risk factors with the client, you can work together to ensure early intervention can lead to slowing of the disease progression, if necessary. An echocardiogram is recommended. You now have useful information to be proactive about this particular patient to ensure we are doing everything possible for them.

Perhaps a different feline patient’s oral microbiome shows a high risk for periodontal disease and tooth resorption based on the DNA profile of the bacteria, fungi, and viruses present in the oral cavity. Even though this patient may be asymptomatic at the time of exam, we can now provide interventions based on these results that can mitigate or prevent certain diseases, perhaps even before traditional diagnostic tests indicate an issue.

I experienced the above scenario firsthand when I performed the Basepaws oral microbiome test on all my personal cats. All tested in the low-risk category except for 1, who was shown to be high risk based on the oral microbiome results. At the time of diagnosis, this cat was only 10 months old and no clinical signs that my family had noticed. Based on this result, I examined her mouth more closely and immediately noticed that she did, in fact, have significant gingivitis in her caudal oral cavity. This simple test had brought an issue I wasn’t aware of to light, and now I am better equipped to address her oral care moving forward in a proactive manner. Imagine that one of your clients with no veterinary knowledge is in the same situation. Their cat’s oral disease could have been progressing for years without them knowing. Now we can recommend biannual oral exams and additional dental diagnostics to better serve this client and patient.

It’s easy to imagine other scenarios that allow proactive intervention in ways never before possible. A pet at high risk for chronic renal disease can be started on a protein-restricted diet at an earlier age; a pet at risk for ocular conditions will now have a full ophthalmological exam biannually. Consider the canine patient whose genetic report revealed a mutation associated with inherited/idiopathic epilepsy. Although not much can be done to prevent this condition or slow the progression, client education regarding how to recognize a seizure and what to do if it happens can give peace of mind and demonstrate that you are heavily invested in their pet’s quality of life and well-being. These are just a few of the countless examples of the information gleaned from a genetic test, giving us opportunities to better care for our patients in a personalized way.

As demonstrated, the care we can provide our clients and patients with is much more comprehensive with the addition of genetic testing in our hospitals, and the benefits don’t stop there.

SUCCESS FOR YOUR BUSINESS

Not only does the genetic testing you deliver offer clinically relevant and valuable information to your clients, but it can also provide your practice with an additional income stream. Risk factors noted in genetic tests performed in your hospital during wellness exams will need to be evaluated further. This will lead to additional office visits and examinations, imaging, and dental procedures. Working in a collaborative manner with our clients will necessitate additional follow-up diagnostics to address these findings, and this extra revenue can be extremely beneficial to your practice.

Additionally, client adherence to recommendations can often be challenging. When your plan for proactive care includes expanded diagnostics, increased periodic visits for medical progress, and lifestyle recommendations that include at-home care protocols, clients may want additional justification of the added expense. Providing supportive information, including results from their pet’s genetic report and other baseline diagnostics, can help you communicate your care plan more effectively and increase adherence to recommendations.

CONCLUSION

So, what will you do to elevate the care you provide to your patients? Genetic testing has finally arrived in veterinary medicine. The great news is it can be incorporated into your practice immediately. The platforms that are available to today’s veterinarians have the ability to transform the ways that we communicate and serve modern pet parents.

By utilizing the affordable and easy genetic tests available, we can help our clients ensure their pets are taken care of in once unheard-of ways. Working with pet parents proactively not only benefits the pet patient, but also your business by adding additional income and strengthening your relationship with your clients as you work collaboratively to care for their pets. By elevating the type of medicine we provide, we are doing our part to ensure the human-animal bond remains the strongest bond in the world.

REFERENCES


November 2022 dvm360® 57
Drug expiration dates

Information your practice needs for less risk, higher margins

How to navigate the transition from beyond-use dates to expiration dates

Traditionally, veterinary hospitals and clinics use neighborhood or national 503A compounding pharmacies to fill prescriptions for compounded medications. These medications are labeled with a beyond-use date (BUD). With the growing number of 503B manufactured veterinary medicines available, you may notice these products are labeled with an expiration date instead. Understanding this seemingly small difference can make a significant difference to your standard of care and your practice’s bottom line.

BUDs for compounded sterile and nonsterile preparations from 503A pharmacies are never dated longer than 6 months, and limited documentation is provided to prove otherwise. United States Pharmacopeia (USP) new guidelines will limit these dates even further.1

You’ll notice expiration dates for 503B manufactured medicines typically offer a far longer shelf life, ranging from months to years. The expiration date is determined after robust stability testing that is required by the FDA’s current Good Manufacturing Practices regulations. This longer shelf life and comprehensive stability testing offer veterinary practices the following:

• Improved inventory management and reduced waste
• Stock available for office use, improving patient care
• Accurate dosing and reduced risk of contaminated drugs and toxic byproducts

Inventory waste due to expired medicines can represent 1.5% to 2% of your total revenue. By stocking 503B manufactured medicines with longer shelf lives, veterinary practices can reduce guesswork, improve outcomes, and boost profit margins.

BUDS VS EXPIRATION DATES

Expiration dates are established after robust stability testing, which includes multiple product lot analyses of several different types of stability: chemical (potency and chemical integrity of active ingredients), microbiological, physical (palatability, appearance, solubility, viscosity), therapeutic, and toxicological.

Although 503B manufacturers have established repeatable testing protocols to confirm stability at 3, 6, 9, and 12 or more months, 503A pharmacies typically lack the resources to do so.

In place of stability testing to establish an expiration date, these pharmacies determine a BUD, an educated guess based on manufacturer recommendations for the reference drug, published clinical literature, and limits set by the USP. Variations in formulation, packaging, and storage can alter a product’s stability.

WHY DRUG STABILITY MATTERS

Stability testing ensures the product’s safety, quality, and efficacy. It plays an important role in safeguarding patient well-being. Products that exceed their shelf life or those that have incorrectly assigned BUDs can cause a variety of problems that affect patient health, including degradation or increased concentration of the active ingredient; contamination during distribution or storage; changes in the drug’s bioavailability, altering the rate and amount absorbed by the patient; and development of toxic byproducts over time.

For patients who require a highly customized preparation, it’s important to understand the difference between BUDs and expiration dates, as well as the trade-offs involved. With the growing availability of 503B medicines with rigorous stability testing standards, expiration dates offer veterinary practitioners far greater confidence in a medication’s stability and help reduce inventory waste. Products with expiration dates have quality built in.

REFERENCE


Written by
Melissa King, PharmD

King, PharmD, is a pharmacist and operations leader at Epicur Pharma. She oversees manufacturing and distribution operations in accordance with current Good Manufacturing Practice (cGMP) regulations. cGMPs are integral to 503B drug manufacturing, and King is working to raise the bar in veterinary medicine. King earned her PharmD from the University of the Sciences in Philadelphia, Pennsylvania.
Advancing Veterinary Shock Wave Therapy Through Evidence-Based Medicine

Over 15 YEARS of Unmatched and Ongoing Clinical Research

Sedation-free, noninvasive healing for your patients.

Canine Treatment Areas

The PulseVet® shock wave technology has been clinically proven to enhance the quality and speed of healing in various musculoskeletal indications, such as:

- Ligaments
- Tendons
- Osteoarthritis
- Lick Granulomas
- LS Disease
- Non-Union Fractures

To learn more about the PulseVet system or set up a demo, call or click

Zomedica.com/pulsevet | info@zomedica.com | 800.245.4417
Why shock wave therapy can’t be imitated in patient care

The multimodal approach to canine rehabilitation using shock wave therapy

written by Andrea L. Henderson, DVM, MS, DACVSMR

Extracorporeal shock wave therapy (ESWT) is a versatile, noninvasive treatment that can induce healing mechanisms for poorly vascularized and chronically injured musculoskeletal tissues and can provide extended pain relief for joints and other tissues with degenerative diseases. Although ESWT applications in other aspects of medicine (eg, lithotripsy) and in human and equine sports medicine have preceded its widespread use in dogs, this therapeutic modality has a rapidly increasing body of evidence to support its application in canine rehabilitation.

PHYSICS

ESWT consists of the conversion of low-frequency, single high-velocity acoustic waves into mechanical energy that is transmitted through tissues according to their acoustic impedance and is released at tissue interfaces. This creates a rapid pressure wave, followed immediately by a vacuum in pressure and resultant collapse of cavitation bubbles that leads to free radical production, release of anti-inflammatory cytokines, and angiogenic and growth factors at the site of interaction. These changes at the cellular level contribute to enhanced healing mechanisms at the sites of injury where the tissues interface.1

Shock wave energy pulses can either be focused or unfocused. The 3 types of focused shock wave generators include electrohydraulic, electromagnetic, and piezoelectric units. Radial pressure wave devices may be referred to as “shock wave” therapy but does not create a true shock wave – these units create unfocused pressure waves which are substantially lower in energy and have a much shallower energy penetration depth. The 3 types of focused shock wave generators are significantly different in energy output and the vast majority of available veterinary studies have evaluated the use of the electrohydraulic shock wave system.

TENDON AND LIGAMENT HEALING

ESWT has demonstrated efficacy in decreasing pain and improving healing of tendons and ligaments in multiple species, including dogs. Specific evidence supports its use in canine patellar ligament desmitis and biceps and supraspinatus tendinopathy.2,3 Patellar ligament desmitis is a common postoperative complication of tibial plateau leveling osteotomies (TPLOs) in dogs, but the clinical significance of its radiographic changes appears to be variable. That being said, a number of dogs do appear to be clinically affected, and ESWT has demonstrated decreased thickness of the distal patella at 6 and 8 weeks after surgery compared with controls.2 TPLOs are a common surgical intervention for military working dogs, and the author has observed a number of cases with radiographic distal patellar ligament thickening and pain on palpation that improved, along with subjective lameness, after 1 to 2 rounds of ESWT.

BONE HEALING

Biologic therapies are also found effective in the management of tendon and ligament injuries, alone or in combination with ESWT protocols; however, one of the most unique characteristics of ESWT is its ability to initiate or accelerate bone healing. Shock waves create a cellular response in trabecular bone, leading to the formation and recruitment of osteoinductive growth factors, release of mesenchymal stem cells from the marrow, increase in bone morphogenetic protein and nitric oxide, and induction of mitogen-activated protein kinases, which contribute to bone regeneration. Bone subjected to ESWT has greater ash and calcium content, increased mineral density, and greater peak stress and elastic modulus, referring to its ability to handle loads. In humans with nonunion fractures, ESWT had a similar success rate to surgical intervention (76% vs 79%).5

References available online at dvm360.com
Dogs with radial nonunion fractures had complete bony union at 12 weeks after an ESWT protocol, whereas 80% of controls remained at nonunion at the end of the treatment period. ESWT can also improve bone healing rates after TPLOs in dogs, which have significant implications in the sporting and working dog arenas where increased clinical sequelae of faster healing decreases the impact of secondary effects such as disuse atrophy and compensatory tissue and gait imbalances. Kieves and others’ found that the median healing scores of TPLOs were significantly higher at 8 weeks after surgery in dogs treated with focused electrohydraulic ESWT when compared with a sham treatment, with no complications observed as a result of the intervention. Findings from another study demonstrated that dogs treated with ESWT after TPLO had increased vertical ground reaction forces and 2-cm greater thigh circumference than controls at 8 weeks after surgery. Similar decreases in healing time have been achieved in humans, dogs, and rabbits with tendinous fractures, which have some risk for delayed and nonunion due to limited blood supply from surrounding tissue and stress shielding from fixation methods.

OSTEOARTHRITIS

ESWT has been evaluated for the management of osteoarthritis (OA) in several joints in canine patients. One group found that dogs with stifles OA treated with electrohydraulic ESWT had trends of improved peak vertical force and stifles range of motion, whereas dogs with OA that did not receive the treatment had a significant decrease in peak vertical force during the study period. Both treated and control dogs demonstrated improvements in a number of functional assessment scores, suggesting a significant placebo effect for that particular outcome measure. Dogs treated with radial ESWT for hip OA had improved peak vertical force and symmetry indices with respect to lameness at 3 months after treatment; however, limb asymmetry increased again by 6 months after treatment.

NEURODEGENERATIVE DISEASES AND SPINAL PAIN

Chronic, degenerative conditions causing thoracolumbar and lumbosacral pain (intervertebral disc disease, degenerative lumbosacral stenosis, compressive radiculopathy) can be among the most frustrating to treat for rehabilitation practitioners. ESWT has been shown to be effective in improving pain and function in humans and horses with thoracolumbar pain. Shock wave therapy has improved pain and functional outcomes more than physical rehabilitation alone in people with thoracolumbar pain, and was found to be superior to steroid injections for people with facet joint pain in another study. In a study of horses with thoracolumbar pain, ESWT increased mechanical nociceptive threshold in 10 of 12 horses at a number of follow-up time points. ESWT’s role in analgesia is not completely understood, but it appears to have a bimodal treatment effect: acute antinociceptive activity (3-4 days) followed by a chronic phase of analgesia accompanied by tissue healing over 3 to 4 weeks. When ESWT is applied over peripheral nociceptors, it causes transient degradation of nerve polarization through the degeneration of nerve endings. Shock waves may also play a role in myofascial pain relief by breaking up actin and myosin cross-links in trigger points.

MULTIMODAL THERAPY

Canine rehabilitation practitioners have many tools at their disposal, and the use of ESWT in conjunction with therapeutic exercise, drugs, or other modalities is of interest in the multimodal management of patients with many conditions that benefit from rehabilitation. In the study evaluating dogs with biceps and supraspinatus tendinopathies in response to ESWT, the treatment was efficacious regardless of whether therapeutic exercise was also included. Although therapeutic exercise conferred no additional benefit as far as the outcomes assessed in this study, one could argue that additional advantages exist for incorporating ESWT and therapeutic exercise safely within a comprehensive treatment plan. Other benefits of therapeutic exercise, including improvements in muscle mass, proprioception, and joint range of motion, were not evaluated in this study. It is plausible that ESWT allowed for more pain-free execution of exercises and an increased response toward goals that were not specifically examined in this study. Although concurrent use of ESWT and biologic therapies is not well described in dogs, results of studies in other species have garnered interest in the combination. Horses treated with ESWT or other anti-inflammatory modalities or drugs prior to administration of mesenchymal stem cell treatment for tendinopathies, desmopathies, or articular lesions had significantly improved responses to the treatment. Humans treated for knee OA with ESWT combined with intra-articular platelet-rich plasma had improved response scores over those who received either treatment alone. Data from an in vitro study with human chondrocytes suggested that ESWT induced the surface expression of the hyaluronan cell receptor CD44, allowing increased exposure to Hyaluronic Acid (HA) and potentially facilitating degenerative cartilage repair.

ADVANTAGES AND DISADVANTAGES

ESWT can be implemented at a relatively low frequency, decreasing the number of visits to the clinic compared with other modalities for geriatric and/or arthritic patients that may have mobility concerns. Typical protocols may include 2 to 3 initial treatments at 2- to 3-week intervals, followed by occasional maintenance treatments as needed up to every 3 to 6 months. The therapy can be implemented in conjunction with therapeutic exercise, aquatic therapy, pharmacologic therapy, and other modalities as part of a comprehensive, multimodal rehabilitation plan. ESWT lacks the risk of some potential adverse effects, such as bacterial inoculation with local injections. One of the historical disadvantages of focused, high-energy ESWT has been the painful execution of the procedure, requiring sedation for the vast majority of treatments, which can be a challenge in compromised patients. However, recent advances have been made, such as the PulseVet X-Trode that distributes energy over a larger area, decreasing peak pulse and allowing most patients to tolerate treatment without sedation. The practitioner should be aware that some patients may be sensitive to the acoustic pulses, which are still quite loud despite the energy dispersion, and should adjust patient care accordingly. Additional potential adverse effects may be transient soreness, petechiae, and/or ecchymoses at the treatment site, usually only for up to 48 to 72 hours after the session.

ESWT is a unique and highly adaptable treatment modality with a growing list of applications in human and veterinary physical therapy and rehabilitation. Its noninvasive execution, wide range of capabilities for a growing number of musculoskeletal conditions, potentially synergistic role in a multimodal treatment plan, and prolonged pain relief make it an essential tool for the canine rehabilitation practitioner.
**Products+Services360**

The latest products and innovative technology in veterinary medicine

---

**SHRIMP-BASED PROTEIN, A WEARABLE LOCATOR, AND A FREE PET INSURANCE PLATFORM**

**trū Protein**

trū Protein is a high-protein, low-fat pet food and treat ingredient made from 100% ground raw shrimp. It provides nutritional value for companion animals, along with the tasty, authentic taste of shrimp. It is pathogen free and 100% traceable because of the company’s patented Tidal Basin technology.

[trushrimpcompany.com/ tr%C5%AB-protein](trushrimpcompany.com/tr%C5%AB-protein)

**Dogily collar**

The Dogily collar, designed for style, comfort, and function, is built to hold an AirTag to keep tabs on a dog’s location. It is made with 100% high-quality, nonirritating soft leather, and a gold latch. The collar is available in 2 colors: brown and black.

[dogily.com/collections/collar](dogily.com/collections/collar)

**Fetch Forward**

Fetch Forward is a free predictive pet health technology platform from Fetch pet insurance. It displays a dog’s health trajectory and health outcomes by processing information about the dog (ie, breed, age, and zip code) through a patent-pending computational model. This creates a report that detects conditions a dog is most likely to experience during each life stage and provides recommendations to help prevent or manage those risks.

[fetchpet.com/health-report](fetchpet.com/health-report)

---

**ANTIMICROBIAL EDUCATION, GOURMET SUPPLEMENTS, AND RAW TREATS FOR CATS**

**Online Vet Antimicrobial Stewardship (VetAMS) Program**

The international AMR Vet Collective online program offers resources for veterinary professionals to master antimicrobial stewardship knowledge. Each module includes learning activities with updated, accessible, and engaging video and audio content. The platform also features downloadable text files and quizzes. You can complete the modules in any order to earn continuing education points and a personalized VetAMS Stewardship Certificate.

[vetams.org](vetams.org)

**Yummers Food Mix-Ins for Cats and Dogs**

Yummers gourmet mix-ins add flavor, variety, and nutrients to pets’ bowls for a complete and healthy meal. They also provide freeze-dried single-ingredient proteins in recipes, including chicken, beef liver, cheddar cheese, salmon and sweet potato, and turkey and cranberry. Additionally, the functional mix-ins supplement pets’ meals with additional nutrients and target common health needs such as skin and coat, digestive, and heart. They come in elk and beef flavors.

[yummerspets.com](yummerspets.com)

**Health Extension Raw Freeze-Dried Cat Treats**

These easy-to-chew cat treats are made from freeze-dried raw chicken, beef, or salmon. They are full of protein-rich meats and additional superfood ingredients, including coconut oil, turmeric, and organic apple cider vinegar. SuperBites are free of grains, fillers, artificial colors, and preservatives. Plus, they are 100% GMO free.

Experience CE in a whole new way at Fetch San Diego!

Join us live and in person for actionable education, endless inspiration and FUN!

- 3 Days Live
- 49+ Educational Tracks
- 51+ Thought Leaders Nationwide
- 160+ Hours of Continuing Education Credit Hours
- 100+ Exhibitors

DEC. 2-4, 2022 | San Diego, CA

Scan the QR code to register!
National Practice Sales, Valuations, Associate Buy-Ins, Corporate Sales, & Buyer Representation.

Practice appraisal completed in just 2 weeks!

Contact Rebecca Robinson Davis, CBI, at 912-268-2701 or Hello@psavet.com See our national listings at www.practicesalesadvisors.com.

AZ NEW PHOENIX AREA—Thriving clinic grossing $1.2M, housed in prototype 2,200SF facility!

MD NEW BALTIMORE—Highly profitable clinic grossing $1.7M. Estimated after-debt income approximately $460K!

MI NEW HASTINGS—Broadway Veterinary Clinic. Annual gross exceeds $1.1M. After-debt income to new owner estimated at $245K!

NY NEW HOLLIE—Barre Animal Hospital. Solo-doctor producing $850K+ in rev. Owner willing to assist with transition post sale.

AL BIRMINGHAM AREA—Gardendale Pet Clinic. Boasting $750+ in revenue! Recently renovated real estate features new flooring and fresh paint.

FL PANHANDLE—Family-owned solo-doctor practice located just minutes away from beautiful beaches equipped for immediate sale.

NM SANTA FE AREA—Rapidly growing hospital equipped with new digital radiology and housed in a spacious 2,600 SF facility.

NY CROSS RIVER—Cross River Animal Hospital. AAHA Accredited clinic in affluent area. Extravagant 4,000 SF can be leased or purchased.

NY SOUTH SHORE AREA—Thriving practice with $220K+ in revenue. Owner willing to assist with transition post sale.

NY ROME—Adirondack Veterinary Services. Practice and RE offered for only $683K. Owner willing to assist with financing!

TN KNOXVILLE Area—Expected gross for 2022 is $148K+ with significant cash flow! Exceptionally maintained brick facility also offered.

---

**Statement of Ownership, Management, and Circulation**

1. Publication Title: DVM360
2. Publication Number: 338590
3. Filing Date: 9-28-22
4. Issue Frequency: Monthly
5. Number of Issues Published Annually: 12
6. Annual Subscription Price: $51.50
7. Complete Mailing Address of Headquarters or General Sales, and Other Paid or Requested Distribution Outside USPS
8. Complete Mailing Address of Known Office of Publication
9. Total Requested Copy Distribution + Requested/Paid Electronic Copies
10. Total Requested and Paid Print Copies + Requested/Paid Electronic Copies
11. Total Requested Electronic Copies
12. Copies not Distributed
13. Issue Date for Circulation Data Below: September 2022
14. Extent and nature of circulation

<table>
<thead>
<tr>
<th>No. Copies of Single Issue Published Nearest to Filing Date</th>
<th>Average No. Copies Each Issue During Preceding 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,127</td>
<td>54,580</td>
</tr>
</tbody>
</table>

15. Publication of Statement of Ownership — Will be printed in November 2022 issue of this publication.

16. I certify that all information on this form is true and complete. Signature and Title of Editor, Publisher, Business Manager, or Owner — Jonathan Severin, Circulation Director, 9-28-22
Son-Mate II Scaler / Polisher
Sale Price $1,975

A.D.S. 2000 Anesthesia Machine / Ventilator
Sale Price $5,995

Engler-Scale-Aire
High Speed Veterinary Dental Air Unit
- 360,000 RPM high speed drill
- 20,000 RPM low speed H.P.
- Built in 25K ultrasonic scaler
- Auto-tune circuitry
- Air water syringe
- On-Demand Compressor (MF)
- H-Frame mobile stand
- Built in water reservoir
- Switching power supply
- Automatic handpiece activators
- Lifetime loaner service
- Proudly made in the USA

$4,995

6 year warranty on Son-Mate II
1 year warranty on Scale-Aire
2 year warranty on A.D.S. 2000

Proudly made in the U.S.A.
In Business Since 1964

1099 East 47th Street - Hialeah, Florida 33013 USA
800-445-8581 / FAX 305-685-7671
www.englerus.com / www.englere411.com

ULTRASONIC REPAIRS
Send your Ultrasonic Scaler for tuning and repair to ENGLER ENGINEERING CORPORATION, the manufacturer of TIPS, STACKS and MARATHON 25K insert, SONUS V, ULTRASON 990, SON-MATE, POLUX and ADS 1000, SONUS II, SON-MATE II and ADS 2000 (Anesthesia Delivery System/Ventilator). Sole manuf. of spare parts for the ENGLER line of scalers and all the former LITTON units the Sonus II, LT.200, Ultrason 600, Veterinarian II & others. Six month warranty on repairs. In business since 1964.

Now Repairing: SHORELINE, Prosonic, Orasonic & AlphaSonic Piezo Electric Ultrasonic Dental Scaler Units
Check out our NEW SUPPORT WEBSITE www.englere411.com

1099 East 47th Street - Hialeah, Florida 33013 USA
800-445-8581 - FAX 305-685-7671
www.englerus.com

Tune in!
The Vet Blast Podcast, a weekly series hosted by veterinarian, author, and social media personality, Adam Christman, DVM, MBA. Each episode, Adam takes a deep dive on the hottest topics in veterinary medicine with education, insight and support to help veterinarians and their teams improve their lives in and out of the practice.

www.dvm360.com/podcasts

Flexible learning with you in mind
Start earning CE hours today at ce.dvm360.com

Mobile Veterinary Clinics
Lower stress on your patients by bringing all your services to your clients. With less overhead and more freedom!

(602) 715-2814  MagnumMobilesv.com

www.medicalworldnews.com
The EZ-Breathe (EZB) was designed to be the simplest anesthesia ventilator available to veterinarians today.

Unlike other ventilators that demand both the space in your operating room and the attention of your technicians, EZB becomes just one more part of your routine surgical procedure. It fits comfortably into any operating room size / protocol and is designed to be permanently attached to your anesthesia machine ready to be used at the push of a button.

**Easy to use and set up!**

**Engler Engineering Corporation**

- 1099 East 47th Street – Hialeah, Florida 33013 USA
- (800) 445-8581 • (305) 688-8581 • (305) 685-7671
- info@englerusa.com

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**ADS 2000 Anesthesia Machine / Ventilator**

**$5995**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$2995**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1975**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1875**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1335**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1385**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1195**

**Engler Scale-Aire**

- 360,000 RPM High Speed Drill
- 20,000 RPM Low Speed H.P.
- Built-in Ultrasonic Scaler
- Air Water Syringes
- Auto-tune circuitry
- Maintenance free
- "On-Demand" compressor
- H-Frame mobile stand
- Automatic H.P. activators
- Built-in water reservoir
- Switching power supply
- Handshoe operation
- Exclusive Lifetime loaner Service
- Proudly Made in the USA

**Tri-Mate Scaler / Polisher / Electrosurgery 3 Units in 1**

**$1875**
As our latest season of Medical World News™ ends, dvm360® reflects on some of our favorite segments from this season and seasons past! Join dvm360® guests as they help improve your mental well-being, or take a second to decompress while learning about the world of dragon boating.

**Veterinarian sings medicinal music**

Check out our Medical World News™ segments featuring speakers from the 2022 Fetch dvm360® Conference in San Diego, California, plus the latest After Hours™ episode.

**AFTER HOURS™: SINGING FOR JOY**

On this episode of After Hours™, John Meyers, PhD, explains how singing has always been one of his secret passions. Meyers talks about how he directed his love of singing to bringing joy and music to patients with dementia and Alzheimer disease.

www.medicalworldnews.com/view/after-hours-singing-for-joy

**WELLBEING CHECKUP™: I-MESSAGE VS YOU-MESSAGE**

With this installment of Wellbeing Checkup™, Carolyn Shadle, PhD, MS, discusses different ways in which veterinary professionals can take care of their mental health in and out of the workplace.

www.medicalworldnews.com/view/wellbeing-checkup-i-message-vs-you-message

**INSIDE THE PRACTICE®: INSIDE FEAR FREE**

On this episode of Inside the Practice®, the founder of Fear Free, Marty Becker, DVM, shares what inspired him to launch Fear Free, stories from when he was incorporating the initiative into the clinic, and what he sees for its future.

www.medicalworldnews.com/view/inside-the-practice-inside-fear-free

**AFTER HOURS™: DRAGON BOATING**

On the latest episode of After Hours™, dvm360® rows through the world of dragon boating and discovers how Alison Whiter, DVM, stumbled upon an opportunity that became a passion and joy in her life.

www.medicalworldnews.com/view/after-hours-dragon-boating

**DO YOU OR YOUR PRACTICE BELONG ON THESE SHOWS?**

Email us at news@dvm360.com for more information and the chance to be featured on Medical World News™ in upcoming seasons.
At 1:00 AM, the young man is awakened by violent banging at the foot of his. Still half asleep, he jumps out of bed. His 3-year-old mixed-breed dog is having violent convulsions—her neck is drawn backwards, her teeth are chomping, and her outstretched tongue is encased in thick foam. Haphazard paddling of limbs is pushing her around the floor, knocking her into the bedframe over and over until it abruptly subsides after what seems like hours. With the man’s assistance, she stands, but she is not herself. Her eyes are dilated, she is bumping into walls, and she does not recognize him. Some 10 minutes later, she seems more normal and eats voraciously as he does an online search to figure out what happened. The immense body of information that he sifts through offers conflicting and scary facts—and he settles into reading about seizures and their management.

Seizures are one of the most common conditions in dogs, occurring in approximately 0.82% of the pet population. They vary in frequency, severity, character, and cause. When your client comes to you panicked, it is best to have a general outline approach to counseling them. This is when I break into my “spiel”—simplifying information to a cartoonish level that can convey complex mechanisms concerning causes, diagnostics, and, most importantly, therapy in an easily understandable manner.

WHAT ARE SEIZURES?

Brain cells constantly communicate with each other in a wave of asynchronous electrical activity. When cells start working together and set up a more synchronous pattern (“the bad guys”), they set up a seizure focus. The rest of the brain (“the good guys”) generally can suppress this excitation with their normal inhibitory signals. The generalized seizure occurs when an imbalance occurs and “the good guys” fail to stop “the bad guys.” The physical manifestation of seizures reflects where the seizure’s focus occurs. For example, if it is in the right motor region of the rear limb, kicking will occur; if it is in the left somato-sensory cortex, a phantom sensation may be felt in the left cheek. When the entire brain is involved, the generalized tonic-clonic seizure, also known as “the grand mal seizure,” occurs.
Advise clients to switch to an equivalent preventative that that uses a different mechanism of action. Internal abnormalities most often are associated with hepatic dysfunction, particularly in a younger animal. Portosystemic shunts most commonly are involved, and they can cause a various types of neurologic dysfunction. Other metabolic encephalopathies can be caused by electrolyte abnormalities or hypoglycemia.

Problems in the brain are characterized by the “DAMNIT V or VITAMIN D” classifying scheme. Young animals have seizures from neurodegenerative conditions (those rare lysosomal storage disorders you learned about in veterinary school) and anomalous conditions, such as hydrocephalus and lissencephaly. Middle-aged dogs are most predisposed to inflammatory disease. Meningoencephalitis is more common than most realize and is more often noninfectious than infectious. A conversation about this possibility with clients may be challenging, because they may that associate the word “meningitis” with a bacterial meningococcal more commonly diagnosed in children.

Portraying the immune system as a learning computer can be helpful in such discussions. As we grow up, our immune system teaches itself, “This is a pollen; this is a virus—I need to fight these. This is my joint; this is my bone—I should leave them alone.” In some animals, that computer is faulty; when triggered by an outside stimulant, the immune system can inappropriately attack the brain. Comparisons to rheumatoid arthritis or lupus often can make this concept more understandable. Infections that we encounter include cryptococcus, toxoplasmosis, and neosporosis. In cats, feline infectious peritonitis must always be considered as a possible viral cause. In certain locations, fungal infections are strongly considered. In older animals, neoplasia is a greater consideration. Advances in imaging technology have identified other senior causes, such as brain microbleeds. This list, however, animals with metabolic and structural encephalopathies often have interictal neurologic abnormalities that are noted by the owners. Seizures make neurolocalization “easy,” because they only emanate from the forebrain, essentially being pathognomonic for that region. This part of the brain includes the large cerebral hemispheres and thalamus, also known as the supratentorial (rostral to the tentorium osseum) or the prosencephalon (the embryologic combination of the telencephalon and diencephalon). Functional disturbances in this location may cause other functional disturbances, including changes in mentation (eg, behavioral abnormalities, dullness, head pressing). Compulsive behaviors, such as circling and pacing, are also common.

Structural lesions often cause asymmetric deficits, whereas metabolic ones are often bilateral; this, however, is not a hard and fast rule. These deficits include loss of proprioception manifested as scuffing of the toes, poor postural reactions on hopping and placing tests on 1 side of the body. They are often combined with poor responses.

SEIZURES ARE NOT A DISEASE

The first objective is to tell the client that seizures are not a disease—they are a reflection of changes in the brain that cause clinical signs and symptoms. I often compare seizures to a cough, which may imply the presence of a lung disease but that may be caused by anything from allergies, smoking, and pneumonia to a tumor. We then discuss seizures involving problems outside the brain, problems inside the brain, and idiopathic seizure disorder.

Problems outside the brain, also known as metabolic encephalopathies, are often thought of as external irritants or internal abnormalities that cause alterations in neuronal function. Numerous external toxins can be found in common household items or medications. Infrequently, these may include preventatives. The association with preventatives is difficult, in that seizures tend to be cyclical and often recur monthly, as do changes in preventatives. When in question, I often advise clients to switch to an equivalent preventative that that uses a different mechanism of action. Internal abnormalities most often are associated with hepatic dysfunction, particularly in a younger animal. Portosystemic shunts most commonly are involved, and they can cause a various types of neurologic dysfunction. Other metabolic encephalopathies can be caused by electrolyte abnormalities or hypoglycemia.

Problems in the brain are characterized by the “DAMNIT V or VITAMIN D” classifying scheme. Young animals have seizures from neurodegenerative conditions (those rare lysosomal storage disorders you learned about in veterinary school) and anomalous conditions, such as hydrocephalus and lissencephaly. Middle-aged dogs are most predisposed to inflammatory disease. Meningoencephalitis is more common than most realize and is more often noninfectious than infectious. A conversation about this possibility with clients may be challenging, because they may that associate the word “meningitis” with a bacterial meningococcal more commonly diagnosed in children.

Portraying the immune system as a learning computer can be helpful in such discussions. As we grow up, our immune system teaches itself, “This is a pollen; this is a virus—I need to fight these. This is my joint; this is my bone—I should leave them alone.” In some animals, that computer is faulty; when triggered by an outside stimulant, the immune system can inappropriately attack the brain. Comparisons to rheumatoid arthritis or lupus often can make this concept more understandable. Infections that we encounter include cryptococcus, toxoplasmosis, and neosporosis. In cats, feline infectious peritonitis must always be considered as a possible viral cause. In certain locations, fungal infections are strongly considered. In older animals, neoplasia is a greater consideration. Advances in imaging technology have identified other senior causes, such as brain microbleeds. This list, however, animals with metabolic and structural encephalopathies often have interictal neurologic abnormalities that are noted by the owners. Seizures make neurolocalization “easy,” because they only emanate from the forebrain, essentially being pathognomonic for that region. This part of the brain includes the large cerebral hemispheres and thalamus, also known as the supratentorial (rostral to the tentorium osseum) or the prosencephalon (the embryologic combination of the telencephalon and diencephalon). Functional disturbances in this location may cause other functional disturbances, including changes in mentation (eg, behavioral abnormalities, dullness, head pressing). Compulsive behaviors, such as circling and pacing, are also common.

Structural lesions often cause asymmetric deficits, whereas metabolic ones are often bilateral; this, however, is not a hard and fast rule. These deficits include loss of proprioception manifested as scuffing of the toes, poor postural reactions on hopping and placing tests on 1 side of the body. They are often combined with poor responses.
on cranial nerve examination; these include decreased menace response and diminished facial sensation.8

That said, I’ll often tell owners that “seizures are a blessing.” This is initially met with skepticism until I tell them the story of a friend from veterinary school. He headed a soccer ball and developed double vision that didn’t resolve for 2 weeks. He went to a neurologist and was diagnosed with a brain tumor. Dogs can’t tell us that they suffer from these subtle symptoms, so seizure may be an early warning indicator of a nefarious condition. Large portions of the brain, the so-called silent areas of the forebrain, are not used in normal activity.7 In these scenarios, seizures may be the only clinical sign that dogs develop in the earlier stages. Therefore, seizures are a blessing; they give us an opportunity to diagnose disease well before other clinical signs emerge. At that point, intervention likely will have the best outcome. Neurology can be different from other specialties, in that the wait-and-see approach is often detrimental to prognosis, and early diagnostics can have great benefit.

Idiopathic epilepsy (IE) is the most common cause of seizures.7 The hallmarks of this presentation are that animals have their first seizure when aged 1 to 6 years with normal health between episodes. Certain breeds have a propensity for the condition, but any breed can be affected. This is also true for cats—IE now is recognized more frequently in cats than in past years. Asymmetry, severity, and frequency of events are variables that bear weight in the activity that preceded the paroxysm. Syncope often is one of the most common challenging conditions to distinguish from a seizure. Often, a key hint is the activity that preceded the paroxysm. Syncope often is associated with activity, whereas seizures often occur during rest. Seizures may be followed by a long, abnormal postictal period that may include disorientation, blindness, or polyphagia; after a syncopal event, dogs often return to normal. Motor activities (eg, paddling, jaw chomping) are more indicative of a seizure, but both seizures and syncope can involve the patient moving or being limp. Perhaps one of the most telling differences is the presence of autonomic dysfunction in seizure disorders. Frothy ptyalism and loss of urinary control are seen almost exclusively with seizures.8

Other neurologic conditions can be paroxysmal. In acute vestibular dysfunction, for example, patients can fall on their side and have padding motions as they attempt to right themselves. Nystagmus is not specific to primary vestibular events, and it can be noted during a seizure.19 Narcolepsy with or without cataplexy constitutes a paroxysm that is rarer and often associated with an excitatory stimulus.32 Myasthenia gravis and other neuromuscular weakness can present as paroxysmal.33 Even neck pain can be confused with seizures because of rhythmic muscle fasciculations and an outstretched neck coupled with jaw chattering.

Paroxysmal dyskinesia (PD) is a group of disorders formerly known as the movement disorders.34 These intermittent muscular contractions can be very difficult to differentiate from seizures; this is particularly true of simple focal seizures, which may involve the animal being conscious. Some PD can have stereotypical signalings and characteristics, but advanced diagnostics are sometimes needed to distinguish these phenotypes. Electroencephalography, the only test that can help in the definitive diagnosis a seizure, may be needed in these cases. Notably, some cases of PD recently have been linked to gluten ingestion.

Another paroxysm recently distinguished from epileptiform events is fly biting.44 Certainly, this may represent seizures that are mostly commonly caused by distemper. However, a strong association with gastroesophageal reflux disease has been established; this phenotype may be an attempt to resolve esophageal discomfort. Affected dogs often respond to a combination of diet change and gastrointestinal (GI) protectants.

THE DIAGNOSTIC WORKUP

Every young animal that has seizures should undergo a complete blood count, blood chemistry analysis, and liver function assessment (either a bile acid test or resting ammonia sampling). In the acute scenario, point of care glucose and electrolyte testing are of value.43 Results of these tests will rule out most metabolic disorders. From there, clinical inference becomes important. I suggest that a more extensive workup be performed in any animal aged under 1 year or over 7 years or that “just isn’t right.” The most important variable is the owner’s level of concern. Owners are often able to “feel” if something is off. More frequently than I would like to admit, I have been surprised when I suspect a patient has IE, yet, when the owners push for imaging, a large causal lesion is identified.

The more advanced workup includes an MRI and a cerebrospinal fluid (CSF) tap. CT scans are of lesser value, because their poor soft-tissue resolution during brain imaging complicates the identification of lesions. Many neurologists believe that the increased frequency of diagnosing conditions such as central nervous system inflammatory disease (meningoencephalitis) is more due to use of imaging technology than to prevalence.
Spinal fluid cytology is an important adjunct diagnostic to MRI. It rarely identifies an etiology definitively, but it can be a sensitive indicator for the presence of disease. CSF cytology essentially evaluates 3 parameters: protein levels, the number of white blood cells, and the proportion of these cells found in the sample. An increased cell count, referred to as a pleocytosis, can give helpful clues about the cause.5

MRI and CSF are done in tandem because of their complementary nature and the minimization of risk when they are performed together. CSF is generally considered safe to acquire; if the CSF compartment is under pressure as seen on MRI, however, the risk of postprocedural brain shift/herniation is higher. Brain inflammation (encephalitis) and tumors can be indistinguishable on MRI, but CSF cytology can sometimes differentiate these abnormalities.

These diagnostics are always considered in cases of seizures, but there are 3 real-world variables that must be discussed: cost, anesthetic concerns, and utility. The index of suspicion of IE versus other etiologies is a key factor in condoning the use of diagnostics. Owners of a 3-year-old Labrador may need to invest in antiseizure medications and serum level testing for 10 or more years. Paying for imaging may stand in the way of their ability to finance the cost of important therapy. Anesthesia risks are generally small, but they exist. Perhaps the most important factor is utility—what will you do differently with this information? I try to talk through scenarios of possible interventions that may be options after the imaging results are received. I remind the owners that if invasive therapies won’t be considered, these procedures could produce only academic information along with indications of prognosis. That said, all veterinarians should remember that technology continues to advance the effectiveness of our therapeutics, and diseases previously considered to be grave now have fair or even good prognoses.

**STOPPING THE SEIZURE**

Regardless of its underlying cause, the seizure itself must be addressed. Seizures are bad—they damage the brain (excitotoxicity) and set patients up for worsening seizures (kindling/mirror phenomenon). Although it happens rarely, seizures can be fatal; this is known as sudden unexpected death in epilepsy. Status epilepticus, when seizures last longer than expected or occur too close together, can also cause result in death.5

The basic pharmacology conversation revolves around how seizure medications work. In other words, our primary treatment will center around either silencing “the bad guys” or strengthening “the good guys.”

Phenobarbital and potassium bromide are staples of strengthening “the good guys” by bolstering neurotransmitter signals.17 These extremely effective agents also are our longest used medications. These drugs follow general pharmacologic principles that most clients can understand. The drugs reach serum levels that are either subtherapeutic, therapeutic, or toxic. We want to push these agents to their highest therapeutic level, which can take time and continued work. I offer the analogy of alcohol consumption. Some people are more able to metabolize alcoholic beverages than are others, and continued alcohol use changes tolerance. Therefore, we are embarking on a journey of continued tweaking—never set it and forget it. Presenting this expectation early is important for long-term client satisfaction. The pharmacologic conversation also can help owners to understand why certain medications must be given more frequently than are others.

The intricacies of the medications are extensive, but owners can understand the basics in terms of expected and unexpected effects. Both drugs will cause mild sedation, increased thirst, and urination. Phenobarbital will cause polyphagia, and bromide will cause pelvic limb ataxia. Regarding unwanted effects, phenobarbital can cause liver toxicosis and immune-mediated blood dyscrasias. Bromide therapy has a strong association with pancreatitis. Serum monitoring, particularly with use of phenobarbital, can minimize these concerns.5

So, which to choose? Phenobarbital has more evidence of efficacy, and its use is preferable for patients with a history of GI upset. However, noncompliant owners may be more successful with bromide, since it offers single-day dosing and has a longer half-life (ie, missed doses have less severe effect); further, when serum levels are not monitored, bromide has less severe adverse effect (AE) profile. For those with liver dysfunction, bromide is not metabolized by the liver.

Whereas phenobarbital and bromide “strengthen the good guys,” levetiracetam “quiets the bad guys” by decreasing the release of the excitatory neurotransmitter glutamate. Levetiracetam has revolutionized seizure management because of its high efficacy, minimal AE profile, and general patient acceptance. There is evidence that it decreases the kindling effect of seizures. The Achilles heel of the drug was its dosing (3 times daily); however, the advent of the extended-release formulation has eliminated that dosing scheme for most patients.18 Dose escalations can be multiples of the initial dose without ill effect, although large increases can have diminishing returns on benefit. The drug has reported synergistic effects with phenobarbital and bromide, which may decrease the likelihood of seizures perpetuating more seizures.19

Zonisamide, even when used alone, can be considered the other “secondary treatment” that has moved into primary therapy. The body of evidence to support zonisamide is smaller than those of the other 3 medications, but many patients have had good anecdotal experience,17 i.e. blinded randomized clinical trials (bRCTs). However, zonisamide shares an enzymatic system with phenobarbital, and dose changes in 1 may have implications on serum levels of the other. Zonisamide therapy may be particularly useful in...
treated focal nongeneralized seizures and some cases of PD. The AE profile is low but includes hepatic dysfunction and renal tubular acidosis.30

WHEN DO WE START TREATMENT?

Rarely do we start therapy with 1 seizure event. An exception would be when an underlying condition is identified. For example, in patients with inflammatory brain disease, long-term outcomes have been improved with early antiseizure therapy, and the addition of levetiracetam is common after external head trauma. What about after 2 or 3 seizures? Aggressive management is considered in breeds predisposed to clusters; these include Australian shepherds and border collies. An appropriate time to start any other patient is after more than 3 seizures have occurred.

WHEN SHOULD CHRONIC ANTI-SEIZURE THERAPY START?

After selecting a medication, I discuss the next steps with the client. These medications do not stop seizures; instead, they decrease their frequency and severity. At our practice, 1 seizure occurring every 3 months represents ideal control. Client expectations are imperative in seizure management. Most patients are treated indefinitely, but if a patient does not have a seizure for longer than 1 year, we may consider decreasing the dose or discontinuing the drug immediately.

Monitoring of serum levels focuses on making sure that patients are within the therapeutic range without reaching toxic limits. This applies most directly to phenobarbital, which has a wide therapeutic range and may cause catastrophic hepatic failure if the toxic range is reached. We often try to maximize the dose without exceeding a serum level of 35 µg/mL.30 A common question involves whether serum drug levels should be increased if they are low but clinically effective? There is limited consensus on this question, but most neurologists are satisfied with low serum levels if seizures are abated. Phenobarbital has a half-life that can reach 72 hours. Therefore, we wait more than 2 weeks (usually, 3 weeks) before checking levels after a dose adjustment. Trough levels are ideal but not mandatory. Once “dialized in,” serum drug levels and liver enzyme levels are checked after 6 to 12 months of therapy unless seizure control is not ideal or is changing. The other antiseizure medications can be evaluated; however, this is done less often because of their fewer dose-dependent toxic effects.

The “seizure spier” is far from a comprehensive lecture about seizure management. However, it is a good jumping off point to help your clients to understand and feel comfortable with management of seizures in their pets. Refractory epilepsy is common; in these cases, patients require multiple medications and experience less ideal control of seizures. Fortunately, most patients can be effectively treated with monotherapy. Remind your clients that your team and you are there to support them with this new challenge. Hopefully, you will join me in the reaping the rewards of helping families to manage their pets’ epilepsy.

REFERENCES

Obtain a cat’s consent for care

Taking cues from a feline can help improve a veterinary visit and behavior at home

If it’s good enough for dogs, then why not cats? The latest buzzwords among dog trainers are consent training or cooperative care. I suggest cats can benefit from this practice even more so than dogs.

The concept of consent training is to allow the dog to partake in decisions, or at least that is the perception. For example, ask the dog to lift a paw before clipping a nail and then simultaneously offer a treat. If the dog declines, do not force the issue (as previously practiced). Just try again later.1,2

This dog training approach certainly falls in with what Fear Free espouses. It minimizes fear, anxiety, and stress instead of forcing the issue with, in this instance, the clippers and holding down an uncooperative dog.

Consent training may be the pathway to radically minimize dog bites. Certainly, it’s still important to ask the dog’s handler, “Can I pet your dog?” Now also ask for the dog’s consent. On the surface, that may sound wacky. What if the handler says, “Yes, you may pet my dog,” but the dog is standing stiffly and looking the other way, with ears and tail straight down? That’s a subtle but clear way of indicating, “Don’t interact with me now.”

Dogs and cats are always telling us what they think. To be effective, humans will have to learn their languages. For example, cats can be so subtle that some individuals don’t even believe they’re communicating, but often from the cats’ perspective, they are screaming at us.3

Many dog trainers agree that canines benefit from consent training, which falls under the umbrella of positive reinforcement.4 5 I suggest cats have far more to gain from the practice. For starters, cats are clearly more comfortable when they perceive that they are in control.

The ethological explanation is that cats, being both predator and prey, need to feel safe to feel most secure. One reason why so many cats feel so unsure in veterinary clinics is that they are uncomfortable being out of their territory and feel they have lost control.

Studies specifically targeted on consent, or cooperative care dog training, are seemingly unavailable. Additionally, there is little dialogue in the veterinary industry about this type of care with cats.

Although consent training has many applications and benefits for dogs, it is even more applicable for cats, including those in clinics. Here’s why:

- Consent training will increase feline veterinary visits.
- Cats are control freaks, and consent supports their feeling of control.
- Cats, like dogs, appreciate choice (or at least the perception of choice).
- If cat owners are paying more attention to their pets, perhaps they will be better able to gauge when their cats are not feeling well.

AT VETERINARY VISITS, IF CATS ARE MORE COOPERATIVE, THERE WILL BE A BETTER EXAM

Earning a cat’s consent

Consent training begins before the visit, with an understanding that no cat that is panicked (often referred to as fractious) is going to allow itself to be handled. Each cat should have an emotional record, which may suggest carrier training that begins with encouraging clients to find appropriate carriers and premedication with a nutraceutical, pheromone, or pharmaceutical. The goal is to have a contented cat upon arrival at the clinic.

Just as your own physician wouldn’t begin an exam without first saying hello, you should get acquainted with a cat by first offering a feline-friendly handshake (aim finger pointed toward cat’s nose, to which a cooperative cat will reply with a touch) and a slow blink. Of course, the cat must be reasonably calm in the first place to respond. Only now is it polite to touch the cat. And it’s interesting that, on average, cats’ favorite places to be petted correspond with the locations of pheromone fractions.6 7

When practical, begin the exam where the cat is—even in the carrier—and with the least invasive touch first from head to tail. Offer a reasonably calm cat a distraction, such as a high-value treat or toy. If the cat is not interested, a 3-minute wait may do the trick; a 30-minute wait, however, is unreasonable.

References available online at dvm360.com
The overprotective pet owner

Veterinary professionals can recognize and manage anxiety in clients to improve communication and outcomes for patients.

Editor’s note: All names and businesses in this dilemma case are fictitious, but the scenario is based on real occurrences.

The Clinton Animal Hospital was a progressive small animal practice with 5 veterinarians and a technician staff support of 16 individuals. Additionally, 2 hospital administrators coordinated the management and continuing education of the talented professional staff. Because of recent frictional contacts with some pet owners, the hospital director scheduled a workshop on how to recognize and assist the overprotective pet owner.

Overprotective pet owners display their anxiety and concern in a manner such that staff often brand them as difficult clients. This attitude does not assist the pet’s care. The staff were hopeful that the workshop would provide the tools necessary to resolve these conflicts.

The course taught the staff that the first step is recognizing indicators often displayed by the overprotective pet owner. When entering the exam room, it is not unusual for the pet owner to position themselves between the staff member and their pet. In their initial greeting they may state that their pet is not comfortable with strangers, does not like to be touched, or has had a bad experience when visiting the veterinarian in the past.

When the pet is placed on the exam table, the overprotective owner often wants to assist. Finally, the overprotective pet owner will attempt to relate the dog’s medical history in a way that may minimize symptoms so that the doctor will, hopefully, not reveal any disturbing conclusions.

Unfortunately, a staff member’s initial response to this behavior is to take a defensive posture. But it is important to recognize that these are very anxious pet owners and they are not the enemy. Sometimes we forget how stressful it can be for people to bring their beloved pets to the veterinarian. They often feel helpless in the face of their animals’ discomfort.

When you encounter an overprotective pet owner, the first thing to do is to engage the pet owner in a nonmedical conversation. Compliment the pet. Relate an anecdotal story about your own dog or cat. This way, the client sees you as a fellow pet owner as well. You might ask the client what it is they feel may be the cause of the problem. This allows them to feel they are working in concert with the veterinarian and their defensive posturing often morphs into a cooperative team effort. Implementing de-escalation and emphasizing compassion will lead to a client feeling comfortable and an easier road to the resolution of the pet’s problem.

Do you have further suggestions as to how to assist an anxious overprotective pet owner? We would like to know.

Sometimes we forget just how stressful and frightening a pet owner’s visit to the veterinarian’s office can be. When a pet is ill, and cannot relate its symptoms to the owner, both frustration and fear set in. When coming to a veterinarian, the client often feels powerless and can understandably have a defensive mindset. It is important not to view this pet owner as a “difficult client.” When I am aware that an anxious, overprotective client is scheduled to see me, I often will not wear a medical smock or a white coat but rather casual clothes. This often decreases a client’s subliminal feelings of intimidation.

Overprotective pet owner indicators are excellent guides to helping the patient, the pet owner, and the veterinary staff. Acquiring the tools to assist these clients leads to more effective veterinary care.
GI SUPPORT THAT’S EASY TO STOMACH.

DETECT, PROTECT, AND CONNECT.
THREE SIMPLE STEPS FOR A CONTINUOUS CIRCLE OF CARE.

Detect

There are many causes of GI disorders, and you are the expert at determining the underlying cause. Select the best fit for your patients from Royal Canin’s complete Gastrointestinal line.

Protect

Recommend Royal Canin Gastrointestinal nutrition to help protect and support GI health by providing gut-friendly nutrition with functional ingredients.

Connect

Nourish your relationship when you send pet owners home with support. Keep learning with continuing education courses, TechTalks, podcasts, and more. Get started with free CE from Royal Canin Live!

Scan for more.
Discover innovative breakthroughs: like running ahead of schedule.

IDEXX Reference Laboratories goes above and beyond what you expect from a lab. Through an unmatched combination of tests, support, and technology, we help you reach answers faster and save time for what matters. And there’s nothing more innovative than that.

DISCOVER MORE WITH IDEXX REFERENCE LABORATORIES IDEXX.COM/REFLAB