VOLUME 113, NUMBER 7

July 2018

Vetted™

Because practice ain't perfect.

UBM

[1]Chu H., Chavez L., et al. (1992). Immunogenicity and efficacy study of a commercial Borrelia burgdorferi bacterin. *J Am Vet Med Assoc.* 201(3), 403–411.

[2]Levy S., Millership J., et al. (2010). Confirmation of presence of Borrelia burgdorferi outer surface protein C antigen and production of antibodies to Borrelia burgdorferi outer surface protein C in dogs vaccinated with a whole-cell Borrelia burgdorferi bacterin. *Intern J Appl Res Vet Med.* 8(3), 123–128.

ULTRA™
VACCINES

FULL
PROTECTION

HALF
THE VOLUME

GIVE YOUR PATIENTS A MORE COMFORTABLE VACCINATION EXPERIENCE

With half the volume of standard vaccines, 0.5 mL ULTRA™ vaccines deliver effective disease protection with minimal injection volume. Talk to your Elanco representative about the vaccine designed to be a more comfortable experience for your patients.

FEAR FREE
Taking the pet out of petrified.

Elanco™

VOLUME 113, NUMBER 7

July 2018

UBM

Vetted™

Because practice ain't perfect.

Bugged about **parasites?**
p 3

Friday emergencies
p 28

"Mine!"

5 tips for food aggression p 10

3 **updates** on feline anesthesia
p 5

High-tech for Fido's **heart**
p 8

CCL injuries: Back on their feet
p 14

When should I **biopsy the liver?**
p 18

Vets Against Insanity

The *slightly* scandalous card game for veterinary professionals.

Practicing veterinary medicine is rewarding, important and often all-consuming. It can also be awkward, annoying and (on most days) downright disgusting. Sometimes, all you can do is laugh about it. Enter Vets Against Insanity: a fun, slightly scandalous take on the work and life of a veterinary professional.

Who should play:

- Veterinary professionals (can be various states of frustrated/happy/slightly drunk/ completely sober/tired/overworked)
- Anyone who recently had to squeeze a dog's anal glands
- Everyone who has recently thought, "I'll have to laugh about this so I don't cry"

At its best, Vets Against Insanity is a hilarious tool designed to inspire veterinary professionals to take risks, laugh more, pursue personal development and enjoy more professional satisfaction and success.

Warning: You can play with the regular folks in your life, but do you really want to deal with the blank stares you'll get after playing "radiolucent bladder stones"? To get your game now, go to **dvm360.com/vai.**

dvm360 UBM

The house that Fear Free built

OK, so the mock-up veterinary exam room (built by HospitalDesign360 conference regulars from Animal Arts!) and the charismatic and knowledgeable Jonathan Bloom, DVM, and the attentive audience were all great. But the big reason these demonstrations of low-stress techniques worked is because of one very small canine: Meekah made our day. (Thanks, Meekah's awesome two-legged person, Ashley Irvin!)

What did Meekah, Ashley and Dr. Bloom do? What *didn't* they do? Let's start with the picture above, which shows our canine comrade sporting a bandana sprayed 15 minutes before the visit with Adaptil. "It takes some time for the alcohol carrier in the pheromone spray to evaporate before exposing pets to it," explains Dr. Bloom.

Dr. Bloom says he enters an exam room, greets the pet owner, ignores the dog while putting a bandana on the pooch, and then lets the patient chill for a bit while he talks up the client.

Another thing clients can do in Dr. Bloom's Fear Free-certified practice? Read all about how a veterinary visit is different in a facility that focuses on low-stress care. (Dr. Bloom offers a handout to his clients when they arrive.) "It talks about how your experience will be different today," he says. "Calming music playing, pheromones, doctor approaches calmly and slowly and may ignore your pet at the beginning just to allow time for your pet to get accustomed to us."

Dr. Bloom likes his stethoscope clean and nice-smelling. He wipes down his stethoscope between rooms with Rescue and then a pheromone wipe or spray. "That just increases the concentration and detection of the good pheromones already diffusing through the room," he says.

See Fear Free live

The Fear Free demonstration space will show up again at Fetch dvm360 in Kansas City and San Diego this year. Come see the doctors and team members on hand to demonstrate what calmer visits can look like. Go to **fetchdvm360.com** to learn more and to register.

fetch dvm360 CONFERENCE

PHOTO BY RYAN KRAMER

Vetted™

Creative
Editor/News Channel Director | **Kristi Reimer Fender**
kristi.reimer@ubm.com
Editor/Team Channel Director | **Portia Stewart**
portia.stewart@ubm.com
Editor/Business Channel Director | **Brendan Howard**
brendan.howard@ubm.com
Editor/Medicine Channel Director | **Mindy Valcarcel**
mindy.valcarcel@ubm.com
Content Marketing Director | **Adrienne Wagner**
Senior Content Specialist | **Jennifer Gaumnitz**
Associate Content Specialists | **Katie James, Sarah Dowdy**
Assistant Content Specialist | **Hannah Wagle**
Technical Editor | **Jennifer Vossman, RVT, CMP**
Digital Content Director | **Jessica Zemler**
Digital Design Director | **Ryan Kramer**
Multimedia Producer | **Troy Van Horn**
Marketing Copywriters | **Ericka Cherry, Gabrielle Roman**
Associate Art Director | **Nicholette Haigler**

Sales
Sales Director | **David Doherty**
913-871-3870 | david.doherty@ubm.com
Account Manager | **Angie Homann**
913-871-3917 | angie.homann@ubm.com
Account Manager | **Kelly Main**
(913) 871-3872 | kelly.main@ubm.com
Account Manager | **Emma Pierce**
(913) 871-3873 | emma.pierce@ubm.com
Account Manager | **Terry Reilly**
913-871-3871 | terry.reilly@ubm.com
Account Manager | **Heather Townsend**
913-871-3874 | heather.townsend@ubm.com
Sales Coordinator | **Anne Belcher**
913-871-3876 | anne.belcher@ubm.com

UBM Animal Care
Vice President & Managing Director | **Christie McFall**
913-871-3810 | christie.mcfall@ubm.com
Vice President, Digital Product Management | **Mark Eisler**
Creative Director | **Marnette Falley**
Medical Director | **Theresa Entriken, DVM**
Fetch dvm360 Director | **Peggy Shandy Lane**
Business Manager | **Chris Holston**

UBM Life Sciences
Executive Vice President &
Senior Managing Director | **Tom Ehardt**

Subscriber Services: Visit dvm360.com to request or change a subscription, or call our Customer Service Department toll-free at 888-527-7008. **Reprints:** Call 877-652-5295 ext. 121, or write to bkolb@wrightsmedia.com. Outside the US, UK, direct dial 281-419-5727 ext. 121. **Books and Resource Guides:** Visit industrymatter.com. **List Rental Sales:** Call Anne Belcher at 913-871-3876, or write anne.belcher@ubm.com. **Editorial Offices:** UBM Animal Care, 11140 Thompson Ave., Lenexa, KS, 66049; 913-871-3800. **Websites:** dvm360.com; fetchdvm360.com; UBM.com.

Vetted (USPS 535170, ISSN print: 2469-3987 Online: 2469-3995) is published monthly by UBM LLC, Veterinary, 131 West First St., Duluth, MN 55802-2065. One year subscription rates: $60 in the United States and Possessions; $72 in Canada and Mexico; $97 in all other countries. Single issue orders: $18 in the United States and Possessions; $22 in Canada and Mexico; $24 in all other countries. Periodicals postage paid at Duluth, MN 55806 and additional mailing offices. POSTMASTER: Please send address changes to Vetted, P.O. Box 6087, Duluth, MN 55806-6087. Canadian GST Number: R-124213133RT001. Publications Mail Agreement Number: 40612608. Return undeliverable Canadian addresses to: IMEX Global Solutions, P.O. Box 25542, London, ON N6C 6B2, Canada. Printed in the U.S.A.

UBM

THE GUIDE

July 2018

THE PICKS

(what we care about now)

Should clients be **bugged** about **parasites?**

If so, how come you're not bugging them? (Nicely, of course!) Opinions between veterinarians and pet owners differ about what parasite education, treatment and diagnostics are being done in visits, according to new data from Partners for Healthy Pets, AAHA and the AVMA.

"What have you done lately to my cat's parasites?"

How important is it for a feline routine checkup or preventive care visit to include an internal parasite test?

VETERINARY STAFF	CLIENTS
93%	**70%**
consider this important	consider this important

How important is it for a feline routine checkup or preventive care visit to include broad-spectrum parasite control?

VETERINARY STAFF	CLIENTS
93%	**72%**
consider this important	consider this important

At your cat's most recent checkup or preventive care visit, were the following services discussed with you or performed?

During a feline preventive healthcare visit, are the following services typically performed at every exam?

VETERINARY STAFF		CLIENTS	
internal parasite test	broad-spectrum parasite control	internal parasite test	broad-spectrum parasite control
54%	**56%**	**44%**	**44%**
said yes	said yes	said yes	said yes

Are you dogging canine parasite education?

How important is it for a canine routine checkup or preventive care visit to include a heartworm test?

VETERINARY STAFF	CLIENTS
93%	**80%**
consider this important	consider this important

Results like these were eye-opening for participating veterinary practices, according to the whitepaper "The Opportunity: Pet owners don't always hear what we think we tell them (and how to fix them)." Other major areas of difference between veterinary teams and their clients over education included behavioral assessments, dental exams, pain assessments, retrovirus testing, and weight and nutritional assessments.

For more about the study and to get free tools to survey your own clients and improve client education, visit **dvm360.com/theopportunity.**

ERMAK OKSANA/SHUTTERSTOCK.COM

Could this lung disease that affects dentists affect you too?

The Centers for Disease Control and Prevention (CDC) recently published findings of a cluster of cases of a progressive lung disease called idiopathic pulmonary fibrosis that affected dentists in higher incidences than expected, according to CNN. Eight of the 894 idiopathic pulmonary fibrosis patients treated at the Virginia specialty center that the CDC researched were identified as dentists, while one was a dental technician. That was a total of 1% of the patients, which the researchers told CNN was 23 times higher than expected.

One of the surviving cluster patients reported to the CDC that they had polished dental appliances and prepared impressions without using a mask or other protection.

The report notes that the CDC was unsure what caused the cluster of patients, but recognized that dentists and dental technicians have "unique exposures at work, including bacteria, viruses, dusts, gasses, radiation and other respiratory hazards," the CNN article states. The agency plans to follow up on the cluster of cases and work to draw conclusions about the risks dental and other personnel may have.

So what does this mean for the veterinary profession? We asked Mary Berg, BS, RVT, RLATG, VTS (dentistry), of Beyond the Crown Veterinary Education and frequent Fetch dvm360 speaker, if she thought veterinary professionals who perform dentistry procedures were at risk.

Berg thinks that the article reinforces the need for personal protection equipment (PPE). "The article stated that the cause of the idiopathic pulmonary fibrosis was unknown and listed a long list of possible factors, not to mention a regional aspect. All of the factors listed would be mitigated with the use of PPE," she says.

"In veterinary medicine, we can add exposure to inhalant anesthetics to the list," she continues. "In reality, the percentage of dentists affected was very small—1% in that study—and overall national incidence is unknown. The use of the amalgams in fillings was a potential cancer concern many years ago. With the average age of the individuals, this along with poor PPE could also be added to the list of factors. I'm not too concerned about an issue with veterinarians, especially GPs."

LORI BENETEAU, PHOTOCREO MICHAL BEDNAREK, ANDY FRITH/SHUTTERSTOCK.COM

3 updates in feline anesthesia and analgesia

If you want to know the latest on feline anesthesia and analgesia, Fetch dvm360 conference speaker Sheilah Robertson, BVMS (Hons), PhD, DACVA, DECVA, CVA, MRCVS, is a go-to source.

"Luckily, we've come a long way in feline anesthesia and analgesia recently—a lot of it is to do with new drugs that are specifically approved for use in cats," says Dr. Robertson.

First on her list: the versatile induction drug alfaxalone, which is known for having a wide safety margin. Second: FDA-approved, feline-specific buprenorphine, which is a very good analgesic for cats, Dr. Robertson says.

For the third and final update, Dr. Robertson points out that while dogs and cats have historically been treated similarly with respect to fluid therapy while anesthetized, there's a known difference in their blood volumes—an issue she's crusading to correct.

"We do know that cats do need a much, much lower fluid rate during anesthesia, and that's what we're trying to tell everybody," she says.

Watch the video for more details on these updates in Dr. Robertson's own words (complete with a Scottish accent): **dvm360.com/felineupdates**.

New tricks to take the pressure off dogs with glaucoma

Veterinarians may be gaining the upper hand on this frustrating disease.

By Sarah J. Wooten, DVM

Still reaching for the mannitol to manage emergency cases of canine glaucoma? Fetch dvm360 educator Mark Bobofchak, DVM, DACVO, says there are better options that can drop pressures fast, have fewer side effects, and won't break the bank.

Dr. Bobofchak's first-choice treatment in most cases of glaucoma is a topical prostaglandin analogue—and good news! Generic latanoprost is available and an inexpensive option for your clients. This drug works well for emergency cases and will drop intraocular pressure within an hour in most cases. Keep a bottle at your hospital for emergencies. The main side effect is extreme miosis.

Hyperosmotics temporarily lower intraocular pressure in emergency situations, but they only work for primary glaucoma, are only a Band-Aid, and have side effects. Dr. Bobofchak says the classic treatment is intravenous mannitol (1 to 2 g/kg given slow intravenously over 20 to 30 minutes). Oral glycerin is another option, but Dr. Bobofchak doesn't use it because in his experience it can induce emesis.

Glaucoma is still a disease we don't know how to beat, says Dr. Bobofchak. Provide full disclosure that most medical treatments are just designed to buy time until the client can pursue surgical treatment. Very few dogs with glaucoma can be managed long term with medications alone, but Dr. Bobofchak says you can maintain many patients over a year with appropriate medical therapy. Here are his top picks:

> Oral carbonic anhydrase inhibitors decrease pressure by lowering aqueous production and are a great choice for patients with anterior lens luxation because they do not cause miosis. Oral methazolamide dosed at 2 to 5 mg/kg b.i.d. is readily available but is expensive, can cause metabolic acidosis, and is contraindicated in patients with reduced renal function. Dr. Bobofchak prefers topical carbonic anhydrase inhibitors over oral administration because they are equally effective and don't have any systemic effects. Bonus: Topical dorzolamide is available as a generic.

> Beta blockers decrease production in the ciliary body, and timolol is most commonly used for mild cases. But they are not a great choice for emergency cases or solo therapy, says Dr. Bobofchak. He prescribes beta blockers as adjunct or prophylactic therapy. Cosopt, a combination of dorzolamide and timolol, is a good option to consider for difficult cases.

> Miotics can lower pressure by opening the iridocorneal angle to allow greater drainage. Pilocarpine is still the mainstay treatment, says Dr. Bobofchak. But prices have increased and the preparation is irritating to 50 percent of the canine population.

"The treatment chosen by the ophthalmologist is based on experience and comfort level with the procedure and how to manage the follow-up period," says Dr. Bobofchak. Some choose to use shunts, but he likes to use laser cyclophotocoagulation, which is aimed at decreasing aqueous production by destroying part of the ciliary body. Two options are available. Transscleral cyclophotocoagulation has been around awhile and is performed by placing a laser probe on the exterior of the sclera. Dr. Bobofchak says the hot new trend is endoscopic cyclophotocoagulation, which involves making a small incision in the cornea and inserting an endoscope that allows direct visualization and laser ablation of the ciliary body. It does require lens removal.

The ciliary body can also be ablated by injection of gentamycin into the vitreous cavity. Dr. Bobofchak says this is considered a palliative salvage procedure to reduce pain. It can be done without general anesthesia and is an option for clients on a budget. Cryotherapy is also available.

Dr. Sarah Wooten graduated from UC Davis School of Veterinary Medicine in 2002.

SUSAN SCHMITZ/SHUTTERSTOCK.COM

Free Trial of eVetPractice

eVetPractice is a cloud-based system that allows you to access your veterinary practice management system whenever and wherever you need it.

Go to www.hsvs.com/cloudpower or call 866-973-3622.

eVetPractice
IS NOW
HENRY SCHEIN®
VETERINARY SOLUTIONS

High-tech for Fido's heart

A wireless, AI-enabled stethoscope designed for veterinary patients boldly goes where ... (you know the rest).

By Mindy Valcarcel

We're getting closer to *Star Trek* tech when it comes to collecting veterinary patients' vital signs all the time—you know, holding up a medical device and capturing the data digitally. The newest entrant? Stethee Vet, an AI-enabled stethoscope from M3DICINE.

A part of the Stethee line of products, this model is optimized for your furry veterinary patients by reducing the amount of background noise from said fur. Just hold the wireless device to a patient's chest and listen. The device connects via Bluetooth to an enabled device or wired headphones, providing real-time heart and lung sounds.

To observe changes over time, the company created an AI system called Aida. All data are recorded in the Stethee Vet app, and the technology can even be used for at-home monitoring, bringing telemedicine to life.

Take it from Ashley Saunders, DVM, DACVIM (cardiology), a veterinary cardiologist at Texas A&M, who stated in a company release, "It is routine for primary care veterinarians to acquire second opinions on diagnostic tests that can be easily transferred digitally to a specialist, and Stethee Vet makes this possible with heart and lung sounds. The ability to store these sounds and associated phonocardiograms means that, as with other diagnostic tests like bloodwork, auscultation findings can be monitored over time and potentially help with the assessment of disease progression and response to therapy."

Although currently out of stock, get on the waiting list for this one, folks. And since the AI system is named Aida, let's close with a quote from the Broadway musical of the same name:

Radames: Is this the latest fashion?

Amneris: It is now.

PHOTOS COURTESY M3DICINE

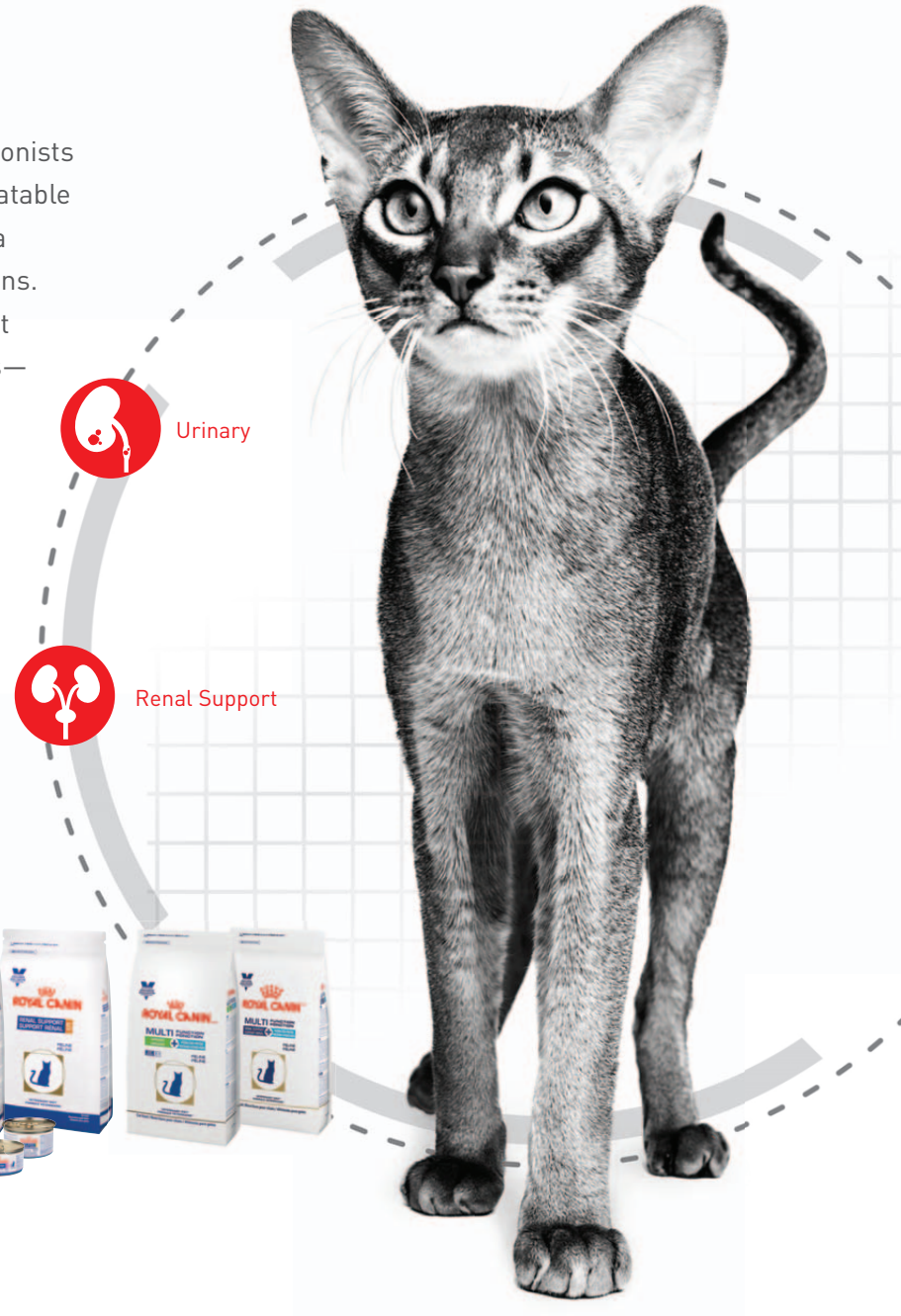
ROYAL CANIN®

INCREDIBLE IN EVERY DETAIL™

YOU'RE THE EXPERT ON **FELINE HEALTH.**

WE'RE EXPERTS IN THERAPEUTIC DIETS **CATS LOVE TO EAT.**

At ROYAL CANIN, our expert nutritionists and veterinarians create highly palatable therapeutic diets to help you treat a wide range of feline health conditions. We have balanced formulas to meet your patient's dietary requirements—from promoting healthy skin on the outside to urinary health on the inside—and the palatability to ensure they get all the nutrition they need.



DISCOVER SPECIALIZED NUTRITIONAL SOLUTIONS FOR ALL THE CATS YOU TREAT.

Learn more at **ROYALCANIN.COM**

Featured Formulas:

5 things you need to know about food aggression

Use these tips to help comfort concerned clients' worries about their pet during mealtime.

By Sarah J. Wooten, DVM

While behavioral consultations are not the strong suit of most general practitioners, there is still basic advice you can and should give your clients regarding food-bowl aggression. Julia Albright, DVM, MA, DACVB, Fetch dvm360 conference speaker, shares five tips for fielding food bowl aggression questions from concerned clients.

1 Let sleeping dogs lie, and eating dogs eat

Avoidance is a good idea regardless of the family's choice for structured behavior modification or not, Dr. Albright says. In some situations, the family may find avoidance the best policy (feeding behind a physical barrier and not messing with the dog during mealtime). If there are children involved, feed the dog behind a closed door to avoid incident. The clients may feel this is all that is needed to keep everyone safe and happy. Aside from some exceptions with a new dog or puppy that may need to learn that food is not a scarce resource, never free feed a dog with food-bowl aggression. If the food is there all the time, then the dog may feel the need to continually guard the resource, says Dr. Albright.

2 Emotion drives behavior

As Sophia Yin, DVM, showed us, reward-based training is a very effective and humane way to change most any behavior. However, we shouldn't forget a dog's underlying emotional state also motivates her to act a certain way. Ivan Pavlov (does that ring a bell?) is famous for recognizing the type of involuntary learning (also known as classical conditioning) that causes an association between a person, place, or thing and an inner state. A seemingly neutral stimulus can therefore trigger strong emotional response. For example, a dog with separation anxiety sees you get your keys and starts whining because keys = you leave. The dog doesn't decide to whine; it is an involuntary reaction learned through repetition, like Pavlov's dogs that salivated when he rang the bell. On the other hand, reward-based training, or operant conditioning, is learning

Jog your memory

The two types of learning are:

Operant

This is both the reward-based and the traditional, aversive-correction type of learning; it happens when an animal voluntarily chooses to perform a behavior based on past consequences.

Classical/Pavlovian

This is an involuntary pairing of something in the world with a physiologic response. There is an emotional connection involved.

behavior through consequences—either praise or punishment. In this example, trying to decrease the whining through aversive correction increases the distress the dog feels about his family departing, making the separation anxiety worse in the long run.

Likewise, food-bowl aggression can also be addressed using classical conditioning principles. Think about the underlying emotion for food bowl aggression: people approaching the bowl = possible loss of food. Especially in the early stages of the disorder, if your client reports that the dog stiffens, eats faster when you approach the food bowl (an early sign of resource guarding), or even growls, Dr. Albright recommends advising the client to start tossing a highly palatable treat in the bowl every time they approach the dog at the food bowl, preferably before the dog gets upset and from a safe distance. That way, the dog builds a positive association between the human near the food bowl and a tasty treat, and over time, the aggressive behavior may be extinguished. Dr. Albright also says this is a good idea to help prevent the problem in non-food-aggressive dogs. If there are children in the home, she also recommends involving them in this practice, with the caveat that the children and dog are supervised and precautions (like baby gates or an adult holding the child) are taken to avoid bites. Reward-based training, like asking the dog to sit for the tasty treat when you approach the bowl, is a good option for improving that emotional response to someone approaching the bowl.

Need a hand(out)?
Teach clients about food aggression with the free handout at **dvm360.com/foodguard.**


FROM YOUR VETERINARIAN

How to handle food guarding

When your dog gets aggressive while he eats, it can be detrimental to you and the ones around you. Help build trust to alleviate the negativity surrounding dinner time.

3 Don't mess with the puppy's bowl

Many trainers and vets have recommended messing with the puppy while he is eating (such as taking the bowl away several times, petting the puppy, etc.) to help desensitize the puppy to these actions from humans. But Dr. Albright advises against this because it could actually condition the puppy to think that people around his food are unpleasant. Repeating an action over and over again doesn't always result in the animal learning to tolerate it. It could do the opposite of helping the puppy "get over it." While a dog with a tolerant personality is likely to allow your messing with them while they are eating, in general dogs don't like it, and it isn't a good practice, she says. Clients may inadvertently be creating an aversion to people approaching the bowl if a good reward, like a little treat, isn't also provided. We should be advising clients against poking and prodding a dog while eating. It may help to tell clients that messing with a dog's food bowl when he is trying to eat is like somebody messing with your plate or petting your head when you are trying to eat dinner. Nobody likes that. However, you may be more tolerant, maybe even look forward to the person approaching if you know that the person was going to give you a small bowl of Ben & Jerry's Chocolate Therapy ice cream every time they approached.

4 Does competition make it worse?

A 2014 article in *Psychology Today* explored the idea that competition for food between a litter of puppies fed from one food bowl could cause food aggression. If one or two puppies got less food, that could set the stage for more competition

Cats and dogs, eating together—mass hysteria!

GLADSKIKH TATIANA/SHUTTERSTOCK.COM

FOOD, GLORIOUS FOOD BOWLS
Check out automatic feeder options at **dvm360.com/autofeeders.**

at the next meal and teach the puppies to eat fast and possibly show aggression. One solution could be to offer more bowls of food than there are puppies to reduce competition. Anecdotally, Dr. Albright says while this might help prevent food-bowl aggression, hunger isn't the only driving factor. We do not really know why dogs develop food-bowl aggression. We can assume genetics and early learning (like every behavior, or disease for that matter) predispose an animal to food aggression. Competition for food among puppies in a litter may be a part of it, but it is probably not the whole story.

5 Labels are for canned goods

When it comes to labeling the type of aggression, Dr. Albright thinks the label is less important and teaches that to her students. Whether it is territorial, dominance, resource guarding or possessive aggression, the type of aggression present doesn't really matter when using a reward-based approach to treat the problem. What matters is that the dog doesn't like something. He thinks that thing sucks, and our job is to make it not suck. Reducing the suck factor is best accomplished through reward-based training (not always treats—It can also be through affection, toy, distance, etc.).

Dr. Sarah Wooten graduated from UC Davis School of Veterinary Medicine in 2002. A member of the American Society of Veterinary Journalists, Dr. Wooten divides her professional time between small animal practice in Greeley, Colorado, public speaking on associate issues, leadership and client communication, and writing. She enjoys camping with her family, skiing, SCUBA, and participating in triathlons.

BACK on their FEET

Try this overview of surgical repair options for cranial crucial ligament injuries in dogs.

By William Snell, DVM, DACVS (small animal)

Canine cranial cruciate ligament (CCL) disease is the most common cause of hindlimb lameness seen in our canine patient population.[1] Rupture of the ligament may occur as a traumatic avulsion, an acute tear from excessive strain or more commonly as a progressive degenerative disease resulting in partial or complete ligament rupture. While any dog breed can suffer from the condition, there are certain breeds that appear to be predisposed. Patients may present at any age, and both neutered and female patients may be over-represented.[2,3] Timing of neuter has not been shown to correlate with this disease, and the disease is thought to be multifactorial. We understand certain genetic, developmental and environmental factors play a role in the degenerative process, including limb anatomic conformation, tibial plateau angle, body condition and activity type, but all factors have not yet been identified. Since the degenerative form of the disease is thought to be progressive in nature, patients may present at varying ages and stages of ligament integrity. It has also been stated that 30% to 40% of patients who tear one cruciate ligament are predisposed to tearing the contralateral limb within one or two years.[4]

The cranial cruciate ligament is important to neutralizing cranial tibial subluxation, internal rotation and hyperextension of the stifle. The ligament itself consists of two bands: craniomedial and caudolateral. The craniomedial band is taut in both flexion and extension, while the caudolateral band is only taut in extension. For this reason, the craniomedial band is often the first portion of the ligament to fail.[1] These patients are considered to have a partial tear, and medical management of these cases has shown variable success depending on the techniques used. For pointers on diagnosis, including radiographic findings (Figure 1), as well as thoughts on nonsurgical management, go to **dvm360.com/cclrepair**.

Consider these surgical management options

Surgical options for these patients are broken down into two general categories: ligament replacement versus biomechanical techniques. More recent literature has suggested that using a combination of a ligament replacement and biomechanical techniques may result in a more stable stifle joint postoperatively.[6] Ligament replacement techniques can be further subdivided into intra-articular or extra-articular techniques.

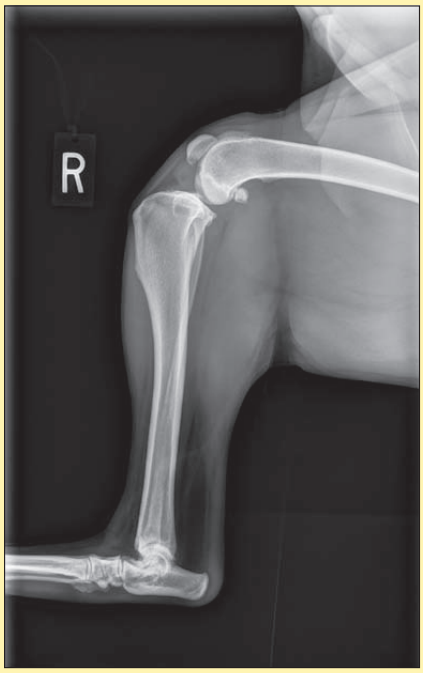
Regardless of stabilization procedure, it's routine to first perform a joint exploration. This may be achieved by an open arthrotomy or arthroscopically. All intra-articular structures should be evaluated, with special attention paid to the articular surfaces of the femur, tibia and patella as well as the long digital extensor tendon, both the cranial and caudal cruciate ligaments and the medial and lateral menisci. Meniscal tears should be débrided if present. There's also continued debate over the procedure known as a "meniscal release." This technique involves transection of the caudal attachments of the medial meniscus with the goal of reducing the risk of subsequent meniscal tearing. However, it has been shown to result an increased contact area of the medial joint compartment, contributing to accelerated development of osteoarthritis in the stifle joint.[7]

Intra-articular stabilization techniques are the mainstay of human anterior cruciate ligament (ACL) re-

pairs. These techniques employ harvesting a biologic graft from another tendon in the body or from a cadaver and then drilling bone tunnels and replacing the torn ACL. The graft will then go through a period of devitalization, followed by revascularization and ligamentization over an approximately 20-week period. During this time, the graft is at a diminished tensile strength, and overuse may lead to graft failure and returned stifle instability. More recent research has focused on synthetic intra-articular replacement or biologic scaffolds as opposed to the biological replacement techniques that have fallen out of favor in the veterinary surgical field. Today, however, most surgeons are finding themselves electing extra-articular or biomechanical stabilization techniques.

Extra-articular repair techniques utilize synthetic materials to traverse and stabilize the stifle joint. The most commonly performed techniques include the lateral fabellar suture, bone anchor techniques and the tightrope technique. In all cases, material is anchored at relative isometric points outside the joint on the distal femur and proximal tibia. Given that there are no true isometric points in the stifle due to the cam-shaped femoral condyles, the synthetic material is subjected to cyclic loading that eventually results in implant fatigue and failure. The goal of these repair options is to stabilize the stifle long enough to allow for periarticular fibrotic tissue to develop and mature over a 16-week period. This periarticular fibrosis becomes the long-term stabilizer of the stifle joint. The main complications of these techniques include implant infection along with premature implant failure.[8]

Figure 1
Right stifle, lateral view. The infrapatellar fat pad is reduced as a result of joint effusion and/or capsular thickening. Mild osteophytes are seen on the distal femur, patella and tibial condyles.



Biomechanical techniques, also known as osteotomy procedures, involve cutting and manipulating the tibia in various ways that result in biomechanical neutralization of cranial tibial thrust in the CCL-deficient stifle. The most common procedures used today are the tibial plateau-leveling osteotomy (TPLO), the tibial tuberosity advancement (TTA) and, more recently, the center of rotation angulation (CORA)-based leveling osteotomy (CBLO). Of these, the TPLO is probably the most widely used osteotomy technique.

With the TPLO procedure (Figure 2), the 90-degree flexed lateral radiograph of the tibia (including stifle and hock) allows for measurement of the tibial mechanical axis, and a bisecting joint line of the stifle allows for measurement of the needed tibial plateau angle (TPA). Average TPAs in dogs range from 25 to 30 degrees.[9] Once the patient's TPA is measured, a dome osteotomy of the proximal tibia is performed and the proximal tibial fragment is rotated a predetermined distance based on the patient's specific TPA. This results in a reduction of the tibia slope to approximately five degrees, thus neutralizing cranial tibial thrust. A bone plate with screws is then used to bridge and stabilize the fracture on the medial tibia. The patient is then limited in activity over the next six to eight weeks while the osteotomy heals.

The TTA (Figure 3) is a technique that involves a linear cut in the tibial tuberosity and advancement (cranial displacement) of the tibial

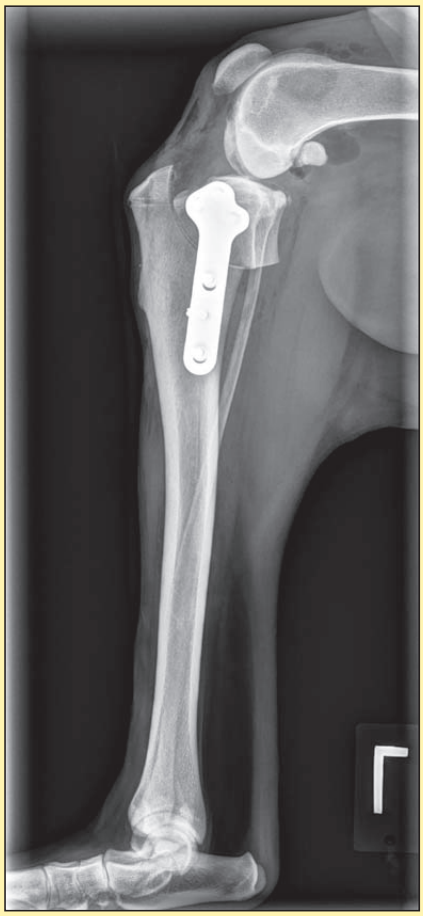


Figure 2 Left stifle, lateral view. Immediate postoperative TPLO.

IMAGES COURTESY DR. WILLIAM SNELL

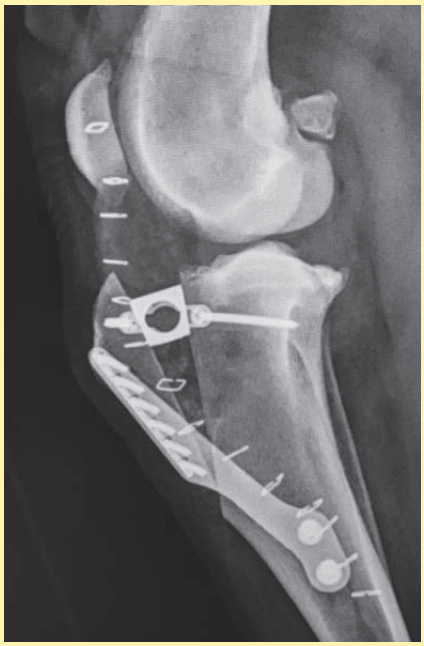


Figure 3 Left stifle, lateral view. Immediate postoperative TTA.

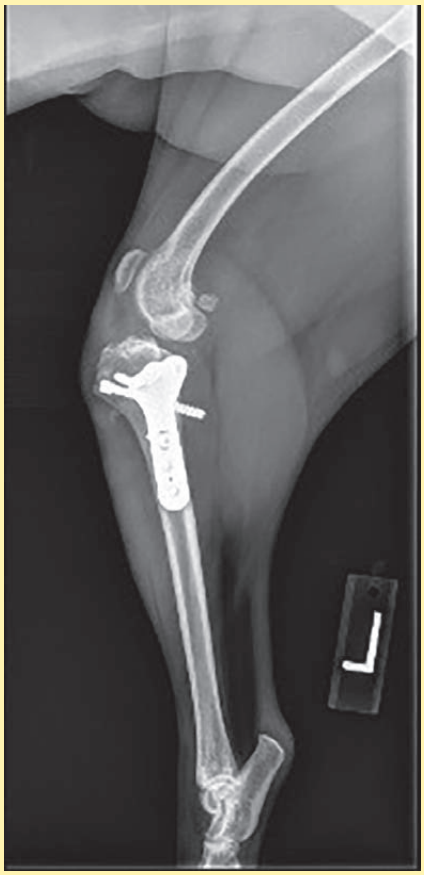


Figure 4 Left stifle, lateral view. Six weeks post-CBLO.

tuberosity fragment in a cranial direction to achieve and maintain a patellar tendon angle of approximately 90 degrees with respect to the premeasured tibiofemoral contact point when the limb is in near full extension. This will in turn result in neutralization of the tibiofemoral shear force in a CCL-deficient stifle joint. The implant system consists of a cage and a bone plate that acts as a tension band. The cage is inserted within the proximal portion of the osteotomy and is size-specific to the intended cranial advancement of the tibial tuberosity fragment. The plate is then secured proximally to the medial aspect of the advanced tibial tuberosity fragment and distally to the tibial diaphysis acting as a tension band. The patient is then limited in activity over the next six to eight weeks while the osteotomy gap fills in and heals. Case selection is important with this technique, as specific tibial tuberosity conformations and excessive TPAs (> 30 degrees) may result in less favorable outcomes.

The CBLO (Figure 4) procedure is the most recently described procedure and is similar to the TPLO in that it is a dome osteotomy technique that attempts to level the TPA. The location of the osteotomy is based on the CORA of the tibia and attempts to place the axis of correction (ACA) in line with the CORA to limit tibial translation, thus limiting a caudal shift in joint forces that have been described with the TPLO procedure. An additional advantage over the TPLO includes the fact that it can be performed in juvenile patients, as the osteotomy and plate placement do not affect the proximal tibial physis and tibial tuberosity apophysis. Further advantages include an increase in fracture contact area for more load sharing, increased proximal fragment bone stock for additional implant placement and ease of adding on ancillary stabilizing procedures.

While each osteotomy procedure may have its own subset of complications specific to each individual technique, all procedures pose similar risks and complications of implant infection and/or failure. At the end of the day the procedure or procedures that are recommended are often determined based on the age, size, body condition of the patient, concomitant morbidities, the comfort level of the surgeon with the described techniques, the expectation of the owner and the pet owner's ability to financially support the recommended procedure.

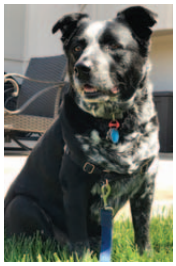
Dr. William Snell is a board-certified small animal surgeon and is currently the medical director at Blue Pearl Veterinary Partners in Boston.

See the complete references online at **dvm360.com/cclrepair**.

OPTIONS FOR OPERATIONS

Check out surgical and DR products at **dvm360.com/products**.

Educate pet owners with the client handout at **dvm360.com/CCLhandout**.



One of our dvm360 editor's dogs recently underwent a TPLO after a sudden CCL injury. Read a client's perspective on managing a pet through the recovery process at **dvm360.com/TPLOperspective**.

orthomed

Don’t be overwhelmed by orthopedics

The complete training experience for orthopedic surgery you can perform with confidence

> *Orthomed is a great company with amazing products.*
> ***I would definitely recommend Orthomed to anyone that has an interest in orthopedics.***
>
> Carl Myers, Theodore Veterinary Hospital

Canine Cruciate Repair

Patella Luxation Repair

Fracture Repair

Las Vegas	Phoenix	Denver
01-02 September 2018	11-12 October 2018	13-14 October 2018

orthomed

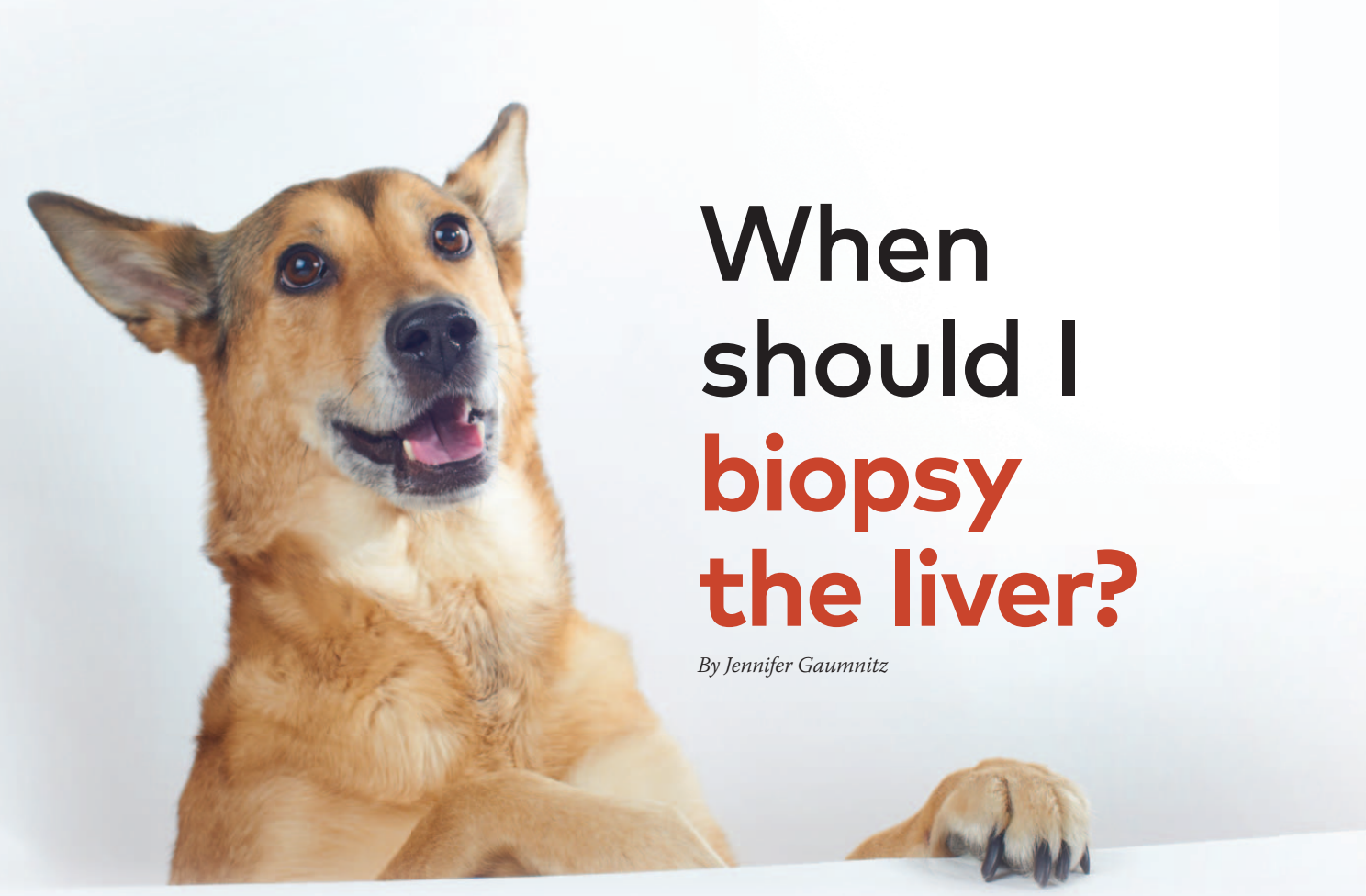
Supporting your journey through veterinary orthopedics

info@orthomedusa.com

www.orthomedusa.com

Orthomed North America Inc - 1179 18th Place, Vero Beach, Florida, 32960

Tel: +1 772-562-6044 **Fax:** +1 772-562-6046



When should I biopsy the liver?

By Jennifer Gaumnitz

As you all too readily know, increased serum liver enzyme activities are common in dogs and are, quite often, a diagnostic challenge. In a recent Fetch dvm360 session, Jonathan Lidbury, BVMS, MRCVS, PhD, DACVIM, DECVIM, said "Increased liver enzymes are a big cause of consternation and confusion among all of us. We have to deal with them all of the time. They're one of the most common laboratory abnormalities of all."

Sometimes increased serum liver enzyme activities occur because the patient does have primary hepatobiliary disease, but sometimes they are secondary to extrahepatic disease. And to confound results even more, tissues other than the liver also produce these enzymes. The liver plays a major role in the metabolism and excretion of drugs and exogenous and endogenous toxins, so it's susceptible to injury from toxins and from diseases in other parts of the body. Plus, increased liver enzyme activities can occur from benign processes (e.g. hepatic nodular hyperplasia) or from conditions that are progressive and require early intervention for the best outcome (e.g. chronic hepatitis).

Performing extensive diagnostic evaluation, including liver biopsy, is costly and clients may be either reluctant or unable to proceed. It can be difficult to know how aggressively to work up these dogs. Dr. Lidbury says that if the cause of the elevated activity is a primary liver disease like chronic hepatitis or a liver tumor, the workup can escalate up to the need to perform a liver biopsy fairly quickly. Contrast that with extrahepatic causes. "Sometimes, especially for mild elevations in alkaline phosphatase (ALP), benign neglect may be the best course of action," he says.

Through a logical, step-by-step approach, you can assess which dogs should be investigated for extrahepatic disease, which cases may need a liver biopsy, and which cases can be managed less aggressively.

To make a definitive diagnosis of primary hepatic disease, a liver biopsy is often required. "This is kind of the last step in the diagnostic workup," says Dr. Lidbury. "It's quite an invasive and expensive technique." Go to **dvm360.com/liverbiopsy** to download a version of the flowchart on the opposite page, which shows how Dr. Lidbury suggests approaching the decision about whether to perform a liver biopsy on a particular patient.

ALEXANDER_EVGENYEVICH/SHUTTERSTOCK.COM

Has a hepatic mass been diagnosed (but the diagnosis is not based on cytology)?

Yes

No

Are there multiple acquired systemic shunts?

Yes

No

Has the dog's ALT been persistently elevated (greater than 2X the upper limits of normal for more than 3 to 4 weeks?

Yes

No

Wait 2 to 4 weeks and recheck ALT or other liver enzymes.

Have you ruled out extrahepatic diseases (e.g. pancreatitis, toxin exposure, diabetes, endocrinopathies)?

Yes

No

Perform other diagnostic screening to rule out extrahepatic diseases—serum chemistry profile, CBC, UA, other liver function tests (e.g. bile acids and ammonia), imaging, cytology.

Is the dog of a breed with a predisposition to primary liver disease?

Yes

No

Do you highly suspect primary hepatic disease?

Yes

No

Monitor ALT and the patient's condition.

Has the owner authorized a liver biopsy?

Yes

No

Proceed with liver biopsy.

Provide supportive care for the day.

A comparison of biopsy techniques

	Percutaneous needle biopsy	Laparoscopic biopsy	Surgical biopsy
Invasiveness	Least	Intermediate	Most
Expense	Least ($)	Intermediate ($$)	Most ($$$)
Size of biopsy specimen	Smallest	Intermediate	Largest
Hospitalization or postoperative care required?	No hospitalization required	Patient is usually discharged same day	Patient may need to be hospitalized; incision requires postoperative care
Bleeding risk	Highest	Low	Low
Ability to control hemorrhage	Least ability to control; if bleeding occurs, may need to perform exploratory surgery to control	Can apply pressure or gel foam to area of hemorrhage through laparoscopic incisions	Direct visualization allows surgeon to control bleeding
Other disadvantages?		Special equipment required, which translates to increased cost for client	
Other advantages?			Visualization of liver and surrounding area is best of three techniques; simple procedure to perform

Before doing a biopsy, Dr. Lidbury recommends assessing the dog's risk of hemorrhage by measuring prothrombin and activated partial thromboplastin time, ideally measuring serum fibrinogen concentration, and performing a platelet count. He also usually does a buccal mucosal bleeding time.

The three types of liver biopsy techniques in dogs are percutaneous needle biopsy, laparoscopic biopsy and surgical biopsy. Each technique has advantages and disadvantages.

> "Increased liver enzymes are a big cause of consternation and confusion among all of us. We have to deal with them all of the time. They're one of the most common laboratory abnormalities of all."

See Table 3 for a comparison of the three techniques. Dr. Lidbury says, "All of them are valid ways to get liver biopsies. It just depends on what you have available and how comfortable you feel. Sometimes it's a bit about the patient, too."

No matter which technique is chosen, it's important to collect multiple biopsy samples. Dr. Lidbury advises, "I'd keep part of the biopsy specimens back for aerobic and anaerobic culture and copper quantification. When you get the pathology report back and it says there are bacteria, or they suspect it's copper, you're going

to regret it if you have thrown everything into formalin."

"Again, it is hard to make universal rules about when to perform a liver biopsy, because every case is different," he says. But when you suspect primary hepatic disease, he advises that it's better to go ahead and do the biopsy rather than delay until the dog is in end-stage liver failure, at which point treatment will probably be ineffective.

Editor's note: This is just a portion of an extensive article titled "Canine liver enzymes—so many questions!" now available at **dvm360.com/liverenzymes**. Check out the online article for nuggets of brilliance like the typical patterns of clinicopathological changes associated with liver disease in dogs, a discussion of how patient history and lab testing can offer clues about the cause of increased serum liver enzyme activities, plus, what comes after a chemistry panel, CBC and UA.

About the speaker: Jonathan Lidbury, BVMS, MRCVS, PhD, DACVIM, DECVIM, is an assistant professor in the Department of Veterinary Small Animal Clinical Sciences at Texas A&M University in College Station, Texas. He is interested in all areas of small animal gastroenterology and is developing new noninvasive tests for liver disease in dogs.

Turn your veterinary practice GREEN

No, not with paint. We have ideas to make your veterinary practice friendlier for the environment, your patients and, yes, you. *By Hannah Wagle*

Much of the time, people consider green actions to be saving resources or reducing energy, and those activities are important, but no one really thinks about how it affects your experience with space. Heather Lewis, AIA, NCARB, partner at Animal Arts in Boulder, Colorado, and HospitalDesign360 conference speaker, has three green ideas to share with you.

No. 1: Hit the lights

Raise your hand (to shield your eyes) if you're not a fan of artificial lighting. Lewis is with you all the way.

Whether you go natural or upgrade your fluorescents, Lewis says, it's a great way to physically create positive change. "High-quality light fixtures use so much less energy than they used to," she explains. "The most savings comes from lighting systems—you can save tons by investing in lighting."

No. 2: Greener means cleaner

Pro tip from Lewis: Switch up your cleaning products.

"Choosing materials and finishes that don't give off gas or using greener cleaning material that'll help indoor air quality can help a veterinary practice exponentially," Lewis says. "There are a lot of compelling reasons to consider it, the biggest reason being the benefit for veterinarians and teams, since they spend so much time at work in those spaces."

In other words, it has to do with good work spaces as well as good cleaning features. "If you're using bleach or something that makes a lot of smells, that's harmful for you and the animals around you. And a lot of other things we use to clean are harmful, inside and out. Let's make a decision that's good for the environment and good for us," she says.

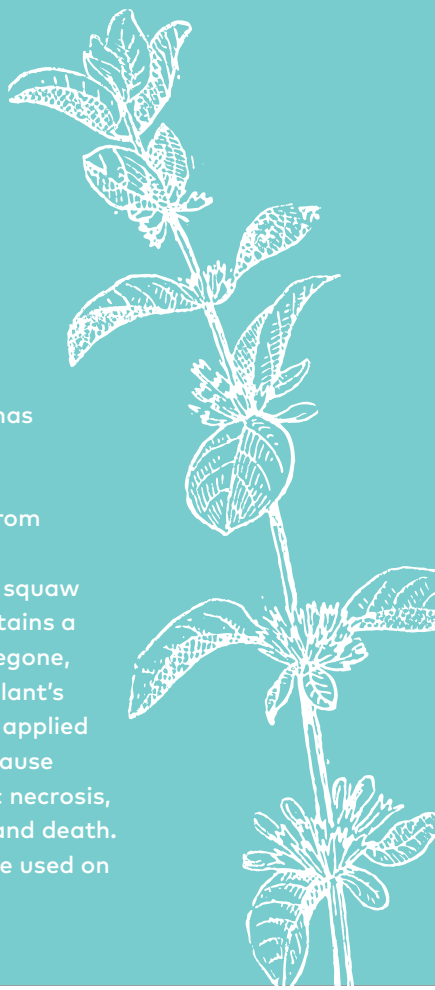
No. 3: Site seeing

There will be instances where you simply cannot make the greener choice when building your hospital. That's why Lewis says to look at the opportunities that already exist around you.

"A green move would be to choose an existing building to make into your veterinary hospital," Lewis says. "This is actually a really big-picture way of recycling. The greenest building is the one that's already there."

If you're having trouble finding the ready-made hospital of your dreams, Lewis says to pay attention to the configuration of the site you're considering. "If you only have access to the north side of the building, and you're already in a northern building, you can't use daylight. If that's a priority to you, talk about it when you're making first decisions. Think about what site you're buying or where you're building," she says.

PHOTO COURTESY OF STUART GOBEY, ISLAND STUDIO PHOTOGRAPHY



Essential oils for fleas and ticks? Not so fast.

You probably think essential oils are harmless or, at worst, mildly noxious—but is that true? At a recent Fetch dvm360 conference, Tina Wismer, DVM, DABT, DABVT, medical director for the ASPCA Animal Poison Control Center in Urbana, Illinois, helped coach attendees on how to respond to clients who say they're using essential oils for flea control. Here are a couple of hot takes:

> Melaleuca oil, from the Australian tea tree, has not been shown effective against fleas and ticks, and it can irritate pets' skin if improperly applied.

> If your clients have been on Dr. Google, they may have read that pennyroyal oil is effective against fleas and ticks. This has not been proven, Dr. Wismer says—but toxicity definitely has. Pennyroyal oil, derived from the leaves and flowers of the pennyroyal plant (also called squaw mint or mosquito plant), contains a volatile compound called pulegone, which is responsible for the plant's toxic effects. If pennyroyal is applied directly to an animal, it can cause depression, vomiting, hepatic necrosis, diarrhea, epistaxis, seizures and death. Pennyroyal oil should never be used on animals.

Manage insecticide-wary clients who own pets with flea allergy dermatitis

An important part of treating a pet allergic to fleas is keeping the pet on year-round flea control. But you've likely encountered owners who have expressed concern they'll be giving their pets an insecticide—whether orally or topically—and they say, that can't be safe! To calm their fears, explain the following:

It's anatomically and physiologically impossible for these products to kill a mammal the same way they kill fleas. Adverse reactions may occur as they can with any oral or topical product of any kind, but they're typically not serious and the benefits far outweigh the risks.

Point out that flea prevention is a lot safer than repeated courses of corticosteroids and antibiotics to manage the clinical signs of flea allergy dermatitis.

Are they still spooked by an orally administered insecticide? These clients may feel more comfortable with a topically applied product. Some topical products, such as imidacloprid, are not systemically absorbed and may better suit this type of owner.

If the allergic effects don't convince owners of a flea-allergic pet to provide flea control, tell them about the diseases that can be caused and transmitted by fleas: iron deficiency anemia and infection with *Rickettsia typhi, Rickettsia felis, Bartonella henselae, Mycoplasma haemofelis, Yersinia pestis* (that's the plague!) and *Dipylidium caninum*.

— Allison Kirby, DVM, DACVD

MORPHART CREATION, BSD/SHUTTERSTOCK.COM

MOBILE VETERINARY

It's the **best resource** you can give to one of the **most important** positions at your practice.

Veterinary receptionists represent animal hospitals. They deeply influence clients.

The **Veterinary Receptionist's Handbook** is written by two experts on veterinary office and veterinary business administrative support work. It's full of real-world advice from experienced receptionists.

Revised and refined, the 3rd edition is the perfect training tool for new and eager-to-learn veterinary receptionists to excel at their job!

order now & save $5! **$44.99**

use code **HANDBOOK** at checkout

just go to
industrymatter.com/handbook
or call
1-800-598-6008

dvm360 firstline industrymatter

UBM

Search for the company name you see in each of the ads in this section for FREE INFORMATION!

ANESTHESIA EQUIPMENT

ARCHITECTS/BUILDERS

ARCHITECTS/BUILDERS

DIAGNOSTIC TESTING

MEDICAL EQUPMENTS

TAGS

PRACTICES FOR SALE OR LEASE

NATIONAL

Ready to sell to Corporate, an Individual or your Associate?

Call 912-268-2701 | 844-4-PSA-HELP for a Complimentary Consultation.

NC, NEW! Asheville area- Call today to be the first to receive practice information!

NC, NEW! High Point- Grossing $800K, $154ATC, Owner Willing to Stay On.

GA, Peachtree City- Only $400K! Commercial Location, Grossing $800K

NC, South Charlotte- Well-Established, Prime Location.

NC Clinton- Tram Road Animal Hospital for Sale! Seller Motivated. Turn-Key, Beautiful facility.

GA, NEW! Rome area- 100% Small-Animal, Spacious Facility, RE Available for $300K

GA, SOLD! Athens- Grossing $700K RE only $350K!

TX, Nacogdoches- Only $495K! Owner Ready to Retire.

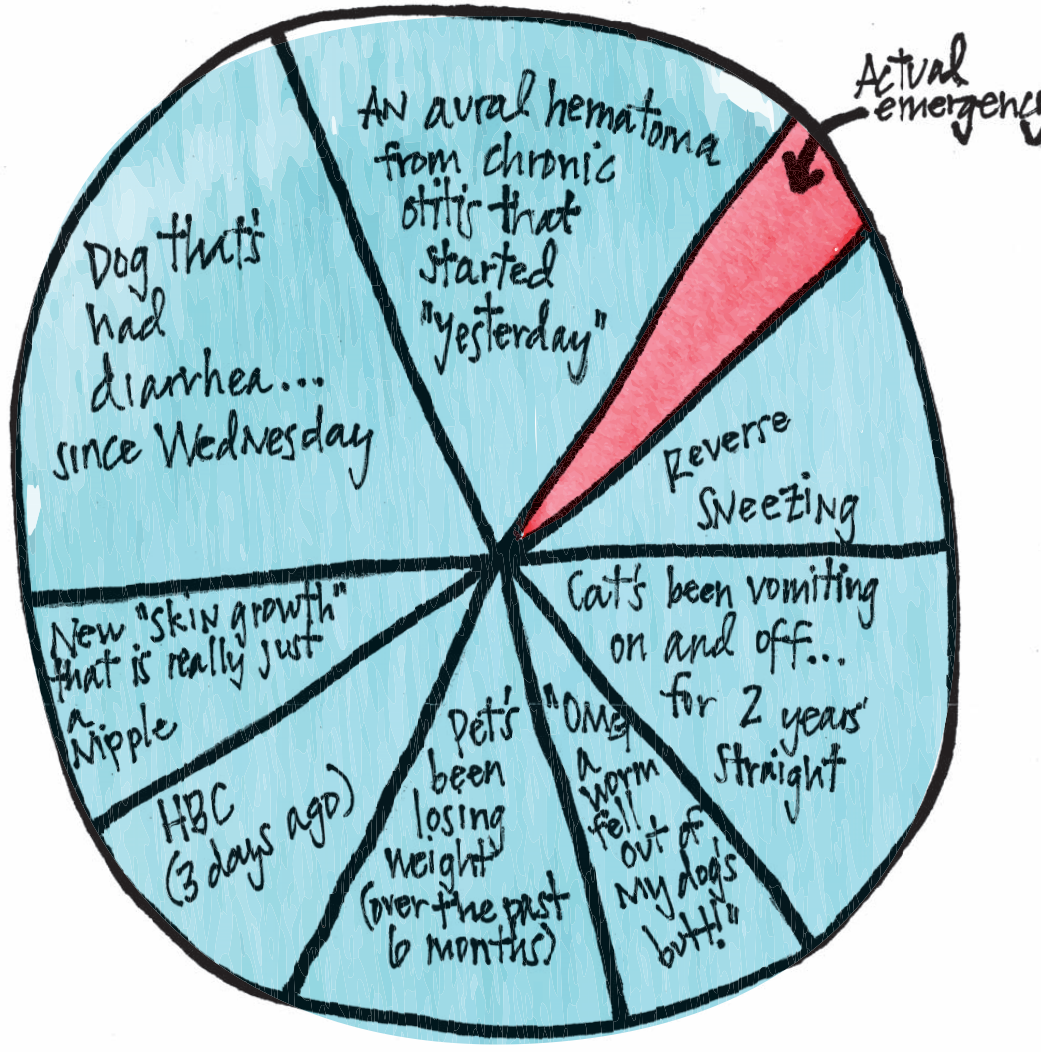
TX, SOLD! McKinney- Grossing over $1mil+, growing commercial location.

WI, Milwaukee- AAFP Practice, Grossing $850K!

See all Practice Listings- www.PracticeSalesAdvisors.com

Friday Emergencies

a dvm360 pie chart



fetch dvm360 CONFERENCE

This pie chart comes courtesy of our resident funny lady client-communication pro Dr. Sarah Wooten. Don't miss Dr. Wooten's sessions at Fetch dvm360 conferences in Kansas City and San Diego! She's speaking on topics that keep veterinarians up at night—because we know you're up late worrying about that crappy (ahem, total BS) Yelp review. Check out what else she's up to at **fetchdvm360.com**.

UBM

On any given day, you're dealing with ...

Money problems
Job performance woes
Relationship struggles
Medical emergencies
Frustrated coworkers
Fractious furballs ...

And you know what? We can't stand it any longer.

Because we think these issues are so critical, you'll find the nurturing you need at every Fetch dvm360 conference.

What does that look like?

- Sessions where your peers talk openly about the solutions to keep from totally losing it on everyone in their lives
- Opportunities to invest in your emotional health, because sanity is something worth fighting for
- Healthy physical activities that change the way you learn and open your mind to new ideas.

All that, and the CE you need to nurture your mind and get back to enjoying your life and work. **Register today.**

Join us in
Baltimore
May 2-5, 2019!

fetch™
dvm360 CONFERENCE

Kansas City, August 17-20, 2018
San Diego, December 13-16, 2018
Baltimore, May 2-5, 2019
Go to **fetchdvm360.com** to learn more.

Practice Power

Are you ready to boost the health of your patients and practice? **PoweroftheInjectable.com** offers value that goes well beyond prescriptions.

Healthy Patients

Deliver safe, rapid, effective and convenient relief with veterinary injectable medications.

- Discover the benefits of injectables and service-based medicine, which offer an assured course of therapy for improved pet health, as well as convenience for your clients

Compliance that eliminates concern

Stronger client relationships

"Long-lasting benefit and no daily interruption in routine. This is one happy dog."
—Pet owner[1]

Healthy Clinics

Access tools to help maximize profitability with an easy-to-implement strategic pricing model.

- Learn how to effectively protect clinic revenues by offering best-in-class injectable services and improve affordability and access to innovative products for dogs of all sizes

Expert tutorials

Injectables pricing calculator

"As a business owner, I'm always looking for ways to improve pricing structure and increase profit margin while making sure medications are affordable for my patients."
—Veterinarian[1]

Give it a shot, log in and learn more today.

The Power of the Injectable
Healthy Patients, Healthy Clinics

Reference: 1. Data on file, Power of the Injectable Exploration Research Report, April 2018, Zoetis Inc.

ZOETIS PETCARE