Veterinary medicine®
Essential medicine for exemplary patient care

INCLUDES THE dvm360.com toolkit
End of life

See Something, Do Something
An oncologist's inspiration to save more pets 148

Ultrasonographic assistance
Using this imaging modality to obtain diagnostic biopsy samples and aspirates 152

Journal Scan
- The effects of animal-assisted therapy 155
- Is there a consensus on managing patients with pyothorax? 156
- The efficacy of an in-house urine test 158

Idea Exchange
Two approaches to at-home urine collection 170

Toolkit sneak peek
- Navigating the end-of-life conversation
- Prognostic indicators for problem behavior cases
- How to talk to grieving owners

Find these tools and more after p158.

UBM

Wound management

How to create transposition flaps

Including a step-by-step video p159

June 2015 | Volume 110 | Number 6 | PEER-REVIEWED | dvm360.com

ROYAL CANIN

STONES CAN'T STAND UP TO OUR SCIENCE

ROYAL CANIN Veterinary Diet® URINARY SO® is proven to dissolve pure struvite stones in cats and helps prevent the formation of both struvite and calcium oxalate crystals and stones.

Royal Canin uses the science of Relative Supersaturation (RSS) to formulate diets. Our research-driven approach is used to provide a complete line of highly palatable feline diets including URINARY SO® Moderate Calorie, a reduced-fat and calorie diet. URINARY SO® is a safe long-term solution to support your urinary patients.

Royal Canin also offers URINARY SO® canine diets.

For more information about the science behind ROYAL CANIN Veterinary Diet® URINARY SO®, visit www.royalcanin.com/urinary or call our Technical Services team at 1-800-592-6687.

Veterinary medicine®
Essential medicine for exemplary patient care

Mission

Veterinary Medicine is a peer-reviewed journal dedicated to providing concise, credible, and essential information on the most common and crucial clinical problems seen in companion-animal practice.

Subscriber Services: Call (800) 815-3400 in the United States, or (888) 527-7008 or (218) 740-6477 in Canada; fax (218) 740-6417; or write to: *Veterinary Medicine*, 131 W. 1st St., Duluth, MN 55802-2065. If you are unable to connect with the 800 numbers, email fulfill@superfill.com. **Reprint Services:** Call 1-877-652-5295 ext. 121 or email bkolb@wrightsmedia.com. Outside US, UK, direct dial: 281-419-5725. ext. 121 **Back Issues:** Individual copies are available for one year; to order, call (800) 598-6008. Permissions/International Licensing. Call Maureen Cannon at (440) 891-2742. **List Sales:** Please contact List Account Executive Renée Schuster at (440) 891-2613. **Editorial Offices:** Write to 8033 Flint, Lenexa, KS 66214; or call (913) 871-3800. **Visit our websites:** dvm360.com; thecvc.com; industrymatter.com.

Veterinary Medicine (ISSN 8750-7943 print; ISSN 1939-1919 online) is published monthly by UBM Life Sciences, 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 Veterinary Medicine, 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.

See Something, *Do* Something: **Why wait? Aspirate!**

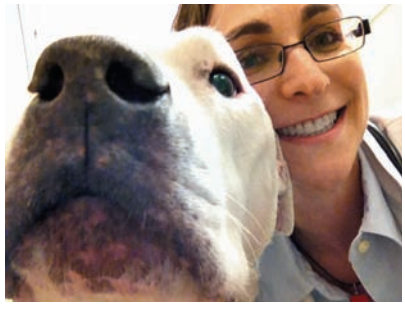
Sue Ettinger, DVM, DACVIM (oncology)

I messed up. Big time. I missed a tumor in my own veterinary technician's dog. I failed Smokey and Amanda. How could I, a cancer specialist, have missed this tumor?

Smokey was my inspiration for a new cancer awareness program called See Something, Do Something. I am on a mission to help us all detect tumors earlier—whether you are a veterinarian, a veterinary team member or a pet owner.

A history of benign masses

At the time, Smokey was a handsome 10-year-old white pit bull that belonged to one of my head technicians, Amanda. I adored them both. Smokey was one of those amazing, soulful dogs that spread sunshine with every wag of his tail. Everyone who met Smokey loved him. He was Amanda's once-in-a-lifetime dog.



Dr. Ettinger and Smokey.

I had aspirated more than 10 skin masses on Smokey over the years, and the masses had always been benign fatty lipomas. When Amanda mentioned she was bringing Smokey in to check out a new mass a few weeks earlier, none of us were worried. Actually the first day Amanda brought Smokey in, the clinic was so busy that we never got to Smokey's aspirate. We assumed it was just another benign lipoma. We got complacent. All the other masses were benign. Why would this one be different?

When Smokey returned the following week, I examined the 7-cm mass that was deeply attached to the underlying tissue on his left flank area. Honestly it didn't look like a malignant tumor. But as I did my aspirate, I could see blood collecting in my needle and syringe. I immediately knew this was not a lipoma. I aspirated the mass in a few more areas, and we submitted the slides to the laboratory for cytologic examination.

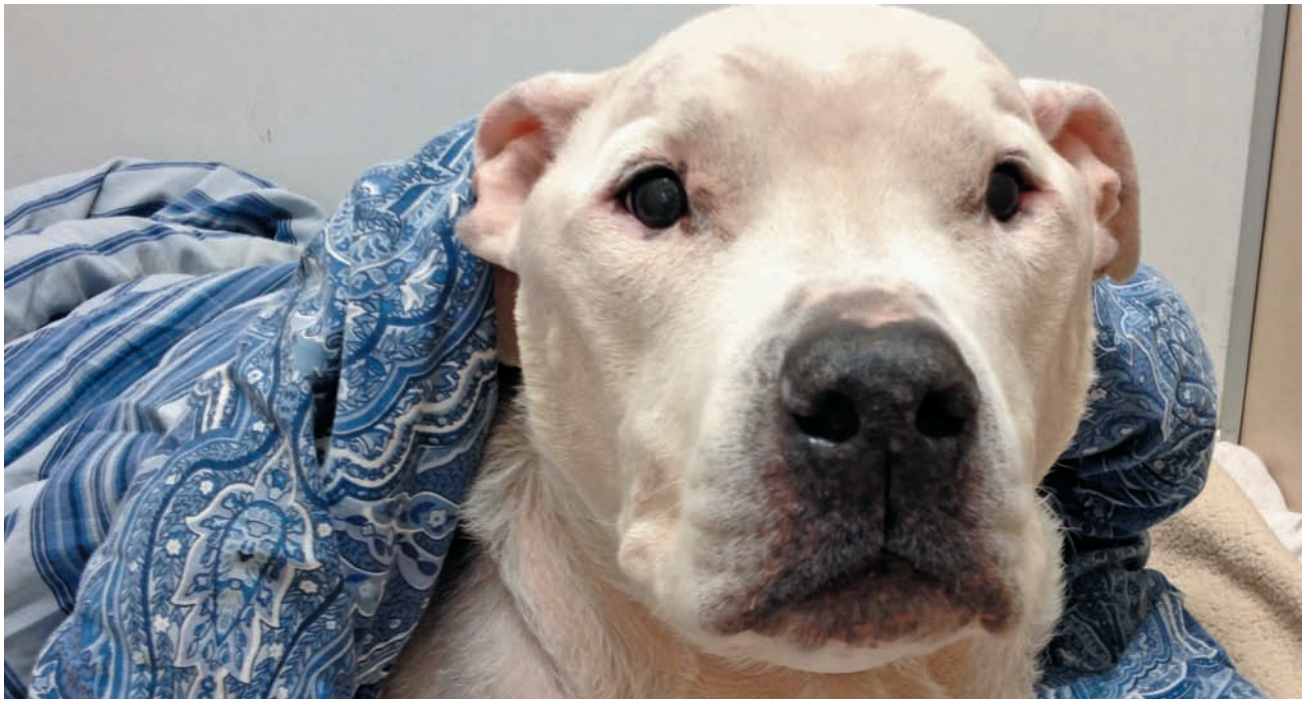
I told Amanda that my clinical hunch was a tumor. Tears welled up in her eyes. As veterinary professionals, we deal with cancer in dogs and cats every day, but nothing can prepare you when it is your pet. I could see Amanda's mind start to race and shut down at the same time. I gave her a huge hug, and we waited anxiously overnight for Smokey's cytology results.

A diagnosis

The cytology came back as a soft tissue sarcoma. Soft tissue sarcomas are malignant and develop in a variety of connective tissues. They can be found all over the body, from head to trunk to paws. Most of these tumors are aggressive locally. They are also prone to come back if they are not removed with wide margins.

The good news is that the

PHOTOS COURTESY OF DR. SUE ETTINGER



Smokey in the intensive care unit after surgery to remove his soft tissue sarcoma.

low- and intermediate-grade versions of these tumors are not such a bad tumor for a dog to have since soft tissue sarcomas typically don't metastasize. Low and intermediate grades of soft tissue sarcomas are very treatable. Surgery can be curative if the mass can be removed completely. That is much easier to do if we find it when the mass is smaller.

For Smokey, the next step was a biopsy to confirm the tumor type and help our soft tissue surgeon appropriately plan his surgery. I ran blood and urine tests and ordered thoracic radiographs and an abdominal ultrasonographic examination to make sure the cancer hadn't spread—all clear!

On surgery day, Smokey had a CT scan to help the surgeon plan the surgery. Smokey's 7-cm tumor required a really big surgery to obtain 3-cm margins, but everything went well.

We focused on his recovery and anxiously waited for his biopsy results. The biopsy report confirmed great news: a low-grade (grade 1) hemangiopericytoma with wide and clean margins. He did not need more treatment—no postoperative radiation or chemotherapy. I just recommended regular monitoring of the scar and periodic thoracic radiographs.

Smokey's inspiration

Even though Smokey's surgery had a happy ending, his malignant tumor really hit me hard. In hindsight, if we had aspirated this earlier when the mass was smaller, his surgery would have been simpler. How could I, a cancer specialist, have missed this tumor?

Were there guidelines I had forgotten? I pulled out my cancer books, journals and cancer notes from my medical oncology residency. No, there are no guidelines for veterinarians or pet owners for when to aspirate or biopsy a mass on a dog or cat. The current recommendations for doing an aspirate include generalities—"recommend if a mass is changing in size or appearance, or bothering the patient."

Owners are often told to

An internal look
Did you see a suspicious lesion on an ultrasonographic examination? A guide to collecting ultrasound-guided samples starts on page 152.

keep an eye on it. But what does that mean? Keep an eye on it for how long? How much can it grow before we should do something?

I hear all too often that a mass does not look or feel malignant. The pet owner should just monitor the mass and wait until it is bothering the pet. This is not good enough! Even an experienced cancer specialist like me cannot look at or feel a mass and know what it is. I am not a microscope.

When tumors grow, what could have been removed with a simple surgery may now require a bigger surgery and sometimes more treatment such as radiation or chemotherapy afterward. Even worse, the tumor may become too big to be removed or treated at all. I see this all the time.

We all must do better. We need guidelines. We must find tumors earlier when they are small. We must aspirate them. With the input of fellow specialists, I have developed See Something, Do Something. And I dedicate it to Smokey:

- **See Something**—If a dog or cat has a mass that is the size of a pea (1 cm) and it has been there one month …
- **Do Something**—Go to a veterinarian and get it aspirated or biopsied.

Do not get complacent like I did. Even after many benign aspirates, the next one can be malignant. Most skin and subcutaneous tumors can be cured if diagnosed early when masses are small. Let's find them earlier and aspirate them when they are small. VM

Sue Ettinger, DVM, DACVIM (oncology), is the head of the Oncology Department at the Animal Specialty Center in Yonkers, New York. Also known as Dr Sue Cancer Vet on Facebook and Twitter, she is a co-author of The Dog Cancer Survival Guide*, 2nd Edition, and co-hosts The Pet Cancer Vet, an Internet radio show on radiopetlady.com. Join in with See Something, Do Something at #whywaitaspirate.*

One and done.

In a U.S. efficacy study, 86% of dogs needed only one injection to resolve their skin infection.[1]

Recommend CONVENIA® (cefovecin sodium) for first-time resolution of bacterial skin infections.

convenia.com

Three-year-old mixed breed diagnosed with facial moist dermatitis treated with CONVENIA 8 mg/kg

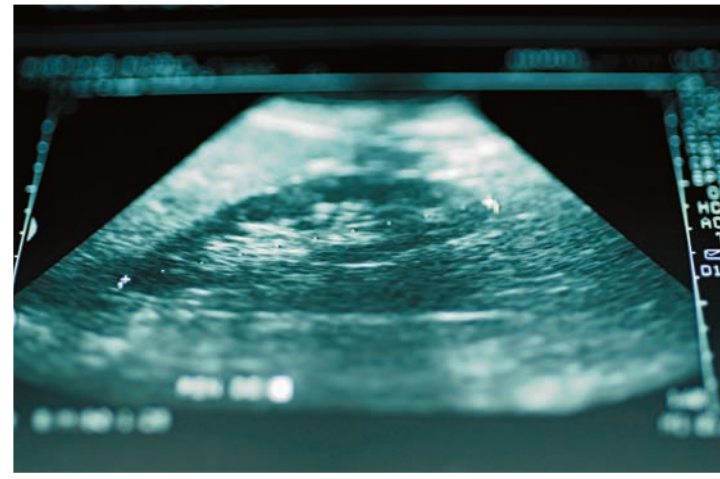
IMPORTANT SAFETY INFORMATION: People with known hypersensitivity to penicillin or cephalosporins should avoid exposure to CONVENIA. Do not use in dogs or cats with a history of allergic reactions to penicillins or cephalosporins. Side effects for both dogs and cats include vomiting, diarrhea, decreased appetite/anorexia and lethargy. See Brief Summary of full Prescribing Information on page 150

[1]Six R, Cherni J, Chesebrough R, et al. Efficacy and safety of cefovecin in treating bacterial folliculitis, abscesses, or infected wounds in dogs. *J Am Vet Med Assoc.* 2008;233(3):433-9.

zoetis

I have an ultrasound machine. How do I aspirate stuff?

If you have access to this advanced imaging technology, use it to its full advantage by having it to guide you to exactly what you want to sample. *By Wm Tod Drost, DVM, DACVR*



You just finished an abdominal ultrasonographic examination and found a lesion or fluid that you would like to aspirate or biopsy. Or maybe you found a lesion in the thorax or on an extremity on which you want to perform an ultrasound-guided aspirate or biopsy. Here's a guide to getting a good sample with ultrasonographic guidance.

Preliminary considerations

First, determine whether the patient's physical condition is sufficient to allow for an aspirate or a biopsy. In most cases, the reward of having a cytologic diagnosis outweighs the risk of the procedure. The risks for each patient will be slightly different. The size and location of the lesion is another factor in deciding whether or not you can obtain a sample.

Coagulopathies and anemia are of most concern when considering puncturing the body wall and internal organs with a needle. Some patients may need transfusions or other types of supportive care before the procedure.

Another big concern is patient motion when performing this procedure. When you choose a sedative, one that causes the least amount of respiratory panting is desired. But a sedative is usually indicated since some animals may lie on the ultrasound table perfectly still for the whole examination, but when a needle is introduced close to the skin, they start moving.

Site localization

Once you locate the lesion you want to sample, determine whether you can safely access the lesion. You want the lesion to be as close to the transducer as possible. If you are not sure if your needle will reach the lesion, you can measure from the upper corner of the image to the center of the lesion. Remember, a 2.5-in needle is 6.35 cm. Sometimes you can add a little pressure to the transducer and bring a lesion closer to the transducer.

The next step is to make sure no critical structures are

CVC

Hear all about it

Hear Dr. Drost's answers to your colleagues' questions during his CVC presentation, including which lesions he won't sample, by scanning the QR code below or visiting **dvm360.com/CVCDrostQA**.

GETTY IMAGES/GLOWIMAGES

between the transducer and the target. We are primarily trying to avoid blood vessels and bowel. If a critical structure is in the projected path of the needle, try readjusting the relationship of the transducer to the lesion. Sometimes this means rotating the transducer 90 degrees. Sometimes the lesion is blocked by critical structures, and you are simply not able to sample the lesion safely.

Some ultrasound machines have an on-screen needle guide, which is for use with a biopsy guide. The biopsy guide is a device that clips onto selected transducers and guides the path of the needle under the transducer. The ultrasound machine displays the projected path of the needle on the screen.

Fine-needle aspiration equipment

You will need:

- 22- to 25-ga, 1.5- to 2.5-in needles
- A spinal needle with stylet if you have a lot of normal tissue to traverse before reaching the lesion (an animal with a lot of fat in the body wall or falciform area, or simply a lesion that is deep within the liver)
- A 6- to 12-ml syringe, with or without an extension set
- A second person to apply suction if you use the suction method (*see below*) with an extension set between the needle and the syringe.

Biopsy device equipment

Multiple biopsy devices are on the market. Most of the devices use needles specific to the device. Typically, the needles are 16- to 20-ga. The biopsy devices

are spring-loaded and must be set before inserting the needle into the patient. Some devices have a safety so you can prevent premature firing of the device. The typical throw on a biopsy needle is 12 to 20 mm. Before you fire the biopsy device, make sure that there is 12 to 20 mm of tissue to sample, otherwise the needle will go too deep and you will sample unwanted tissue.

Some types of biopsy devices have needles that rapidly fire into the tissue, cut a core sample and then retract back into the needle sheath. Other types of biopsy devices allow the user to advance a stylet into the lesion, allowing you to know the extent that the device will sample.

Patient preparation

Clip the hair over site, which has usually already been done because you just performed the ultrasonographic examination. Clean the site to remove ultrasound gel since it can affect certain stains. We use a small amount of rubbing alcohol as the ultrasound contact medium. However, some ultrasound manufacturers will void your warranty if you use alcohol on transducers for their machines. Be sure to check with your sales representative.

Technique

For biopsies, make sure the device is spring-loaded. For both fine-needle aspirations and biopsies, start the needle about 45 degrees to the transducer on the skin. If the lesion is shallow, you may start at an angle more parallel to the skin. If the lesion is deeper, you may start more perpendicular to the skin.

Enter the skin in front or behind the transducer in the plane of the ultrasound beam. Do not enter the skin from the side of the transducer as this limits the amount of the needle you will be able to see. More specifically, you will likely not see the tip of your needle, thus you will not know if you are within the lesion or not.

Initially, you want the needle to remain very shallow until you can verify the location of the needle tip and the direction the needle will travel. Move the transducer to find the needle's location instead of moving the needle to find the transducer. When the tip of needle is located and you are happy with its projected path, advance into the lesion.

Peck method. Once the tip of the needle is in the lesion, move the needle up and down, like a chicken pecking at feed, loading the needle with cells. After a few passes, remove the needle and spread the cells onto a glass slide. Repeat as needed. The Peck method is my preferred method.

Suction method. Whether you are using an extension set between the needle and the syringe or not, once the tip of the needle is in the lesion, apply suction to the needle by pulling on the syringe plunger. Release the pressure. After a few cycles, remove the needle and spread the cells onto a glass slide. Repeat this process as needed. The suction method is preferred when lesions are small and there is not enough room to move the needle up and down.

Preparing the sample

Fine-needle aspirates are blown onto a glass slide and then smeared. Biopsy samples may be rolled onto a glass slide, creating touch preps, before the samples are placed in formalin. A 22-ga needle is useful for teasing samples off biopsy devices.

When performing biopsies, have the containers ready before you start the procedure. Some laboratories prefer the biopsy samples be put into a plastic cassette before placement in formalin. Other laboratories may prefer samples be placed directly in formalin without a cassette. Check with your laboratory for its preferences. VM

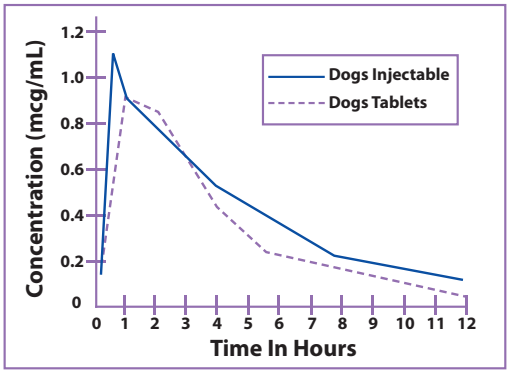
Wm Tod Drost, DVM, DACVR
Department of Veterinary Clinical Sciences
College of Veterinary Medicine
The Ohio State University
Columbus, OH 43210

Enroflox® Injection (enrofloxacin) For Dogs 2.27%

KEY BENEFITS

- Same active ingredient, formulation and dosing regimen as Baytril® Injectable Solution 2.27%
- Concentration-dependent and bactericidal
- Kills a broad range of Gram (+) and Gram (-) Bacteria
- Significant savings versus Baytril Injectable Solution 2.27%

Serum Concentrations Of Enrofloxacin Following A Single Oral Or Intramuscular Dose At 2.5 mg/kg In Dogs



Enroflox® (enrofloxacin) Injection is a fluoroquinolone designed for the management of bacterial diseases, with broad-spectrum activity against both gram-negative and gram-positive bacteria including those causing dermal, urinary and respiratory tract infections. Each mL of injectable solution contains 22.7 mg of enrofloxacin. **Enroflox Injection** is available for dogs only.

DOSAGE AND ADMINISTRATION

Enroflox Injection may be used as the initial dose at 2.5 mg/kg. It should be administered intramuscularly (IM) as a single dose, followed by initiation of enrofloxacin tablet therapy.

Enroflox Injection May Be Administered As Follows:

Weight Of Animal	Enroflox® Injection For Dogs* 2.5 mg/kg
4.5 kg (10 lb.)	0.50 mL
6.8 kg (15 lb.)	0.75 mL
9.1 kg (20 lb.)	1.00 mL
11.3 kg (25 lb.)	1.25 mL
13.6 kg (30 lb.)	1.50 mL
15.9 kg (35 lb.)	1.75 mL
18.1 kg (40 lb.)	2.00 mL
20.4 kg (45 lb.)	2.25 mL
22.7 kg (50 lb.)	2.50 mL

*The initial Enroflox Injection administration should be followed 12 hours later by initiation of enrofloxacin tablet therapy.

HOW SUPPLIED:

Enroflox Injection is available in 20 mL and exclusive 100 mL vials to fit any practice.

Enroflox® Injection
(enrofloxacin)

CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian. Federal law prohibits the extra label use of this drug in food-producing animals. **CONTRAINDICATIONS:** Enrofloxacin is contraindicated in dogs known to be hypersensitive to quinolones. The safe use of enrofloxacin has not been established in large and giant breeds during the rapid growth phase. The use of enrofloxacin is contraindicated in small and medium breed dogs during the rapid growth phase (between 2 and 8 months of age). **WARNINGS: For use in animals only. The use of this product in cats may result in Retinal Toxicity. Keep out of reach of children.** Observe label directions and see product labeling for full product information.

FOR VETERINARY USE ONLY

www.norbrookinc.com

Norbrook®

ANADA 200-513, Approved by FDA

Enroflox®
(enrofloxacin) Injection For Dogs
2.27%

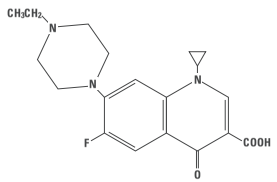
For Dogs Only

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

Federal law prohibits the extralabel use of this drug in food-producing animals.

DESCRIPTION:
Enrofloxacin is a synthetic chemotherapeutic agent from the class of the quinolone carboxylic acid derivatives. It has antibacterial activity against a broad spectrum of Gram negative and Gram positive bacteria (See Tables I and II). Each mL of injectable solution contains: enrofloxacin 22.7 mg, n-butyl alcohol 30 mg, potassium hydroxide for pH adjustment and water for injection, q.s.

CHEMICAL NOMENCLATURE AND STRUCTURAL FORMULA:
1-cyclopropyl-7-(4-ethyl-1-piperazinyl)-6-fluoro-1,
4-dihydro-4-oxo-3-quinolinecarboxylic acid.



ACTIONS:
Microbiology: Quinolone carboxylic acid derivatives are classified as DNA gyrase inhibitors. The mechanism of action of these compounds is very complex and not yet fully understood. The site of action is bacterial gyrase, a synthesis promoting enzyme. The effect of *Escherichia coli* is the inhibition of DNA synthesis through prevention of DNA supercoiling. Among other things, such compounds lead to the cessation of cell respiration and division. They may also interrupt bacterial membrane integrity.[1]

Enrofloxacin is bactericidal, with activity against both Gram negative and Gram positive bacteria. The minimum inhibitory concentrations (MICs) were determined for a series of 37 isolates representing 9 genera of bacteria from natural infections in dogs, selected principally because of resistance to one or more of the following antibiotics: ampicillin, cephalothin, colistin, chloramphenicol, erythromycin, gentamicin, kanamycin, penicillin, streptomycin, tetracycline, triple sulfa and sulfa/trimethoprim. The MIC values for enrofloxacin against these isolates are presented in Table I. Most strains of these organisms were found to be susceptible to enrofloxacin *in vitro* but the clinical significance has not been determined for some of the isolates.

The susceptibility of organisms to enrofloxacin should be determined using enrofloxacin 5 mcg disks. Specimens for susceptibility testing should be collected prior to the initiation of enrofloxacin therapy.

TABLE I – MIC Values for Enrofloxacin Against Canine Pathogens (Diagnostic laboratory isolates, 1984)

Organisms	Isolates	MIC Range (mcg/mL)
Bacteroides spp.	2	2
Bordatella bronchiseptica	3	0.125-0.5
Brucella canis	2	0.125-0.25
Clostridium perfringens	1	0.5
Escherichia coli	4	≤0.016-0.031
Klebsiella spp.	10	0.031-0.5
Proteus mirabilis	6	0.062-0.125
Pseudomonas aeruginosa	4	0.5-8
Staphylococcus spp.	5	0.125

The inhibitory activity on 120 isolates of seven canine urinary pathogens was also investigated and is listed in Table II.

TABLE II – MIC Values for Enrofloxacin Against Canine Urinary Pathogens (Diagnostic laboratory isolates, 1985)

Organisms	Isolates	MIC Range (mcg/mL)
E. coli	30	0.06-2.0
P. mirabilis	20	0.125-2.0
K. pneumoniae	20	0.06-0.5
P. aeruginosa	10	1.0-8.0
Enterobacter spp.	10	0.06-1.0
Staph. (coag. +)	20	0.125-0.5
Strep. (alpa hemol.)	10	0.5-8.0

Distribution in the Body: Enrofloxacin penetrates into all canine tissues and body fluids. Concentrations of drug equal to or greater than the MIC for many pathogens (See Tables I, II and III) are reached in most tissues by two hours after dosing at 2.5 mg/kg and are maintained for 8-12 hours after dosing. Particularly high levels of enrofloxacin are found in urine. A summary of the body fluid/tissue drug levels at 2 to 12 hours after dosing at 2.5 mg/kg is given in Table III.

TABLE III – Body Fluid/Tissue distribution of Enrofloxacin in Dogs
Single Oral Dose = 2.5 mg/kg (1.13 mg/lb)
Post-treatment Enrofloxacin Levels Canine (n=2)

Body Fluids (mcg/mL)	2 Hr.	8 Hr.
Urine	43.05	55.35
Eye Fluids	0.53	0.66
Whole Blood	1.01	0.36
Plasma	0.67	0.33
Tissues (mcg/g) Hematopoietic System		
Liver	3.02	1.36
Spleen	1.45	0.85
Bone Marrow	2.10	1.22
Lymph Node	1.32	0.91
Urogenital System		
Kidney	1.87	0.99
Bladder Wall	1.36	0.98
Testes	1.36	1.10
Prostate	1.36	2.20
Uterine Wall	1.59	0.29
Gastrointestinal and Cardiopulmonary Systems		
Lung	1.34	0.82
Heart	1.88	0.78
Stomach	3.24	2.16
Small Intestine	2.10	1.11
Other		
Fat	0.52	0.40
Skin	0.66	0.48
Muscle	1.62	0.77
Brain	0.25	0.24
Mammary Gland	0.45	0.21
Feces	1.65	9.97

Pharmacokinetics: In dogs, the absorption and elimination characteristics of the oral formulation are linear (plasma concentrations increase proportionally with dose) when enrofloxacin is administered at up to 11.5 mg/kg, twice daily.[2] Approximately 80% of the orally administered dose enters the systemic circulation unchanged. The eliminating organs, based on the drug's body clearance time, can readily remove the drug with no indication that the eliminating mechanisms are saturated. The primary route of excretion is via the urine. The absorption and elimination characteristics beyond this point are unknown. Saturable absorption and/or elimination processes may occur at greater doses. When saturation of the absorption process occurs, the plasma concentration of the active moiety will be less than predicted, based on the concept of dose proportionality.

Following an oral dose in dogs of 2.5 mg/kg (1.13 mg/lb), enrofloxacin reached 50% of its maximum serum concentration in 15 minutes and peak serum level was reached in one hour. The elimination half-life in dogs is approximately 2 ½ -3 hours at that dose.

A graph indicating the mean serum levels following a dose of 2.5 mg/kg (1.13 mg/lb) in dogs (oral and intramuscular) is shown in Figure I.

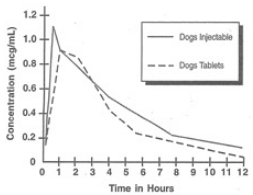


Figure 1 – Serum Concentrations of Enrofloxacin
Following a Single Oral or Intramuscular Dose at 2.5 mg/kg in Dogs.

Breakpoint: Based on pharmacokinetic studies of enrofloxacin in dogs after a single oral administration of 2.5 mg enrofloxacin/kg BW (i.e. half of the lowest-end single daily dose range) and the data listed in Tables I and II, the following breakpoints are recommended for canine isolates.

Zone Diameter (mm)	MIC (µg/mL)	Interpretation
≥ 21	≤ 0.5	Susceptible (S)
18-20	1	Intermediate (I)
≤ 17	≥ 2	Resistant (R)

A report of "Susceptible" indicates that the pathogen is likely to be inhibited by generally achievable plasma levels. A report of "Intermediate" is a technical buffer and isolates falling into this category should be retested. Alternatively the organism may be successfully treated if the infection is in a body site where drug is physiologically concentrated. A report of "Resistant" indicates that the achievable drug concentrations are unlikely to be inhibitory and other therapy should be selected.
Standardized procedures require the use of laboratory control organisms for both standardized disk diffusion assays and standardized dilution assays. The 5 µg enrofloxacin disk should give the following zone diameters and enrofloxacin powder should provide the following MIC values for reference strains.

QC Strain	MIC (µg/mL)	Zone Diameter (mm)
E. coli ATCC 25922	0.008 - 0.03	32 - 40
P. aeruginosa ATCC 27853	1 - 4	15 - 19
S. aureus ATCC 25923		27 - 31
S. aureus ATCC 29213	0.03 - 0.12	

INDICATIONS:
Enroflox™ (brand of enrofloxacin) Injectable Solution is indicated for the management of diseases in dogs associated with bacteria susceptible to enrofloxacin.

EFFICACY CONFIRMATION:
Clinical efficacy was established in dermal infections (wounds and abscesses) associated with susceptible strains of *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis,* and *Staphylococcus intermedius;* respiratory infections (pneumonia, tonsillitis, rhinitis) associated with susceptible strains of *Escherichia coli* and *Staphylococcus aureus* and urinary cystitis associated with susceptible strains of *Escherichia coli, Proteus mirabilis,* and *Staphylococcus aureus*

CONTRAINDICATIONS:
Enrofloxacin is contraindicated in dogs known to be hypersensitive to quinolones.

Based on the studies discussed under the section on Animal Safety Summary, the use of enrofloxacin is contraindicated in small and medium breeds of dogs during the rapid growth phase (between 2 and 8 months of age). The safe use of enrofloxacin has not been established in large and giant breeds during the rapid growth phase. Large breeds may be in this phase for up to one year of age and the giant breeds for up to 18 months. In clinical field trials utilizing a daily oral dose of 5.0 mg/kg, there were no reports of lameness or joint problems in any breed. However, controlled studies with histological examination of the articular cartilage have not been conducted in the large or giant breeds.

ADVERSE REACTIONS:
No drug-related side effects were reported in 122 clinical cases treated with an enrofloxacin injectable solution followed by enrofloxacin tablets at 5.0 mg/kg per day.
To report adverse reactions, call Norbrook at 1-866-591-5777

ANIMAL SAFETY SUMMARY:
Adult dogs receiving enrofloxacin orally at a daily dosage rate of 52 mg/kg for 13 weeks had only isolated incidences of vomition and inappetence. Adult dogs receiving the tablet formulation for 30 consecutive days at a daily treatment of 25 mg/kg did not exhibit significant clinical signs nor were there effects upon the clinical chemistry, hematological or histological parameters. Daily doses of 125 mg/kg for up to 11 days induced vomition, inappetence, depression, difficult locomotion and death while adult dogs receiving 50 mg/kg/day for 14 days had clinical signs of vomition and inappetence.

Adult dogs dosed intramuscularly for three treatments at 12.5 mg/kg followed by 57 oral treatments at 12.5 mg/kg, all at 12 hour intervals, did not exhibit either significant clinical signs or effects upon the clinical chemistry, hematological or histological parameters.

Oral treatment of 15 to 28 week old growing puppies with daily dosage rates of 25 mg/kg has induced abnormal carriage of the carpal joint and weakness in the hindquarters. Significant improvement of clinical signs is observed following drug withdrawal. Microscopic studies have identified lesions of the articular cartilage following 30 day treatments at either 5, 15 or 25 mg/kg in this age group. Clinical signs of difficult ambulation or associated cartilage lesions have not been observed in 29 to 34 week old puppies following daily treatments of 25 mg/kg for 30 consecutive days nor in 2 week old puppies with the same treatment schedule.

Tests indicated no effect on circulating microfilariae or adult heartworms *(Dirofilaria immitis)* when dogs were treated at a daily dosage rate of 15 mg/kg for 30 days. No effect on cholinesterase values was observed.
No adverse effects were observed on reproductive parameters when male dogs received 10 consecutive daily treatments of 15 mg/kg/day at 3 intervals (90, 45 and 14 days) prior to breeding or when female dogs received 10 consecutive daily treatments of 15 mg/kg/day at 4 intervals; between 30 and 0 days prior to breeding, early pregnancy (between 10th and 30th days), late pregnancy (between 40th and 60th days), and during lactation (the first 28 days).

DRUG INTERACTIONS:
Concomitant therapy with other drugs that are metabolized in the liver may reduce the clearance rates of the quinolone and the other drug.

Enrofloxacin has been administered to dogs at a daily dosage rate of 10 mg/kg concurrently with a wide variety of other health products including anthelmintics (praziquantel, febantel), insecticides (pyrethrins), heartworm preventatives (diethylcarbamazine) and other antibiotics (ampicillin, gentamicin sulfate, penicillin). No incompatibilities are known with other drugs at this time.

WARNINGS:
For use in animals only. The use of this product in cats may result in Retinal Toxicity. Keep out of reach of children.
Avoid contact with eyes. In case of contact, immediately flush eyes with copious amounts of water for 15 minutes. In case of dermal contact, wash skin with soap and water. Consult a physician if irritation persists following ocular or dermal exposure. Individuals with a history of hypersensitivity to quinolones should avoid this product. In humans, there is a risk of user photosensitization within a few hours after excessive exposure to quinolones. If excessive accidental exposure occurs, avoid direct sunlight.
For customer service, to obtain a copy of the Material Safety Data Sheet (MSDS) or to report adverse reactions call Norbrook at 1-866-591-5777.

PRECAUTION:
Quinolone-class drugs should be used with caution in animals with known or suspected Central Nervous System (CNS) disorders. In such animals, quinolones have, in rare instances, been associated with CNS stimulation which may lead to convulsive seizures.

Quinolone-class drugs have been associated with cartilage erosions in weight-bearing joints and other forms of arthropathy in immature animals of various species.

The use of fluoroquinolones in cats has been reported to adversely affect the retina. Such products should be used with caution in cats.

DOSAGE AND ADMINISTRATION:
Enroflox Injection for Dogs may be used as the initial dose at 2.5 mg/kg. It should be administered intramuscularly (IM) as a single dose, followed by initiation of enrofloxacin tablet therapy.

Enroflox Injection for Dogs may be administered as follows:

Weight Of Animal	Enroflox – Injection for Dogs* 2.5 mg/kg
9.1 kg (20 lb)	1.00 mL
27.2 kg (60 lb)	3.00 mL

*The initial Enroflox Injection for Dogs administration should be followed 12 hours later by initiation of enrofloxacin tablet therapy.

The lower limit of the dose range was based on efficacy studies in dogs where enrofloxacin was administered at 2.5 mg/kg twice daily. Target animal safety and toxicology studies were used to establish the upper limit of the dose range and treatment duration.

STORAGE:
Store at 59°-77°F (15°-25°C). Excursions permitted up to 86°F (30°C). Brief exposure to temperature up to 104°F (40°C) may be tolerated provided the mean kinetic temperature does not exceed 77°F (25°C); however, such exposure should be minimized. Protect from direct sunlight. Do not freeze.

HOW SUPPLIED:
Enroflox Injection for Dogs Vial Sizes 20 mL and 100 mL

REFERENCES:
[1] Dougherty, T.J. and Saukkonen, J.J. Membrane Permeability Changes Associated with DNA Gyrase Inhibitors in *Escherichia coli.* Antimicrob. Agents and Chemoth., V. 28, Aug. 1985: 200-206.

[2] Walker, R.D., *et al.* Pharmacokinetic Evaluation of Enrofloxacin Administered Orally to Healthy Dogs. Am.J.Res., V. 53, No. 12, Dec. 1992: 2315-2319.

Made in the UK.

Norbrook Laboratories Limited
Newry, BT35 6PU, Co. Down,
Northern Ireland

TAKE TIME
OBSERVE LABEL DIRECTIONS

Norbrook®

04767001

Animal-assisted therapy *helps* patients undergoing chemotherapy

Why they did it

Contact with animals has been shown to have various positive effects on human physical and emotional health. The authors of this study sought to evaluate the impact of animal-assisted visits (AAVs) on the quality of life of people receiving multimodal therapy for head or neck and gastrointestinal cancer.

What they did

The researchers enrolled patients who were receiving combined chemotherapy and radiation therapy for cancer. Patients with dog allergies or dog aversions were not included. There were 37 patients, predominately male (68%) with a mean age of 57 years, included in the intent-to-treat analysis.

Patients were administered a quality-of-life questionnaire designed to measure patient status in areas such as personal well-being, social well-being, emotional well-being and functional well-being. A separate 18-item scale was administered biweekly that assessed "patients' motivation to come to appointments; their tolerance of waiting times; their ability to withstand treatment experience; the effects of the AAV on nausea and pain; the lingering effect of the dog visit after leaving treatment for the day; and the patient's perception of social support owed to the volunteer, the dog, or both."

What they found

Despite declines in personal and functional well-being, the researchers noted a statistically significant increase in social well-being ($P = 0.03$) and emotional well-being ($P = 0.004$). Patient satisfaction with the use of AAV during cancer therapy was high. The authors do point out, however, that patients self-selected to participate in the study, so it was expected they would have positive attitudes toward pets to begin with.

The study authors acknowledge limitations such as the logistics of scheduling AAVs five days a week for six weeks as well as the inability to blind or randomize parts of the study because of patient preferences and concerns about allergies. The researchers speculate that some of these obstacles would not be as big of a concern in a clinical versus a research setting.

Take-home message

Given the positive impact on the emotional well-being of the patients despite the high burden of symptoms experienced during cancer therapy, AAVs should be considered for all patients in this setting.

Fleishman SB, Homel P, Chen MR, et al. Beneficial effects of animal-assisted visits on quality of life during multimodal radiation-chemotherapy regimens. *J Community Support Oncol* 2015;13:22-26.

These "Journal Scan" summaries were contributed by Jennifer L. Garcia, DVM, DACVIM, a veterinary internal medicine specialist at Sugar Land Veterinary Specialists & Emergency Care in Houston, Texas.

Read more summaries at **dvm360.com/JournalScan**.

GETTY IMAGES/SUEMACK

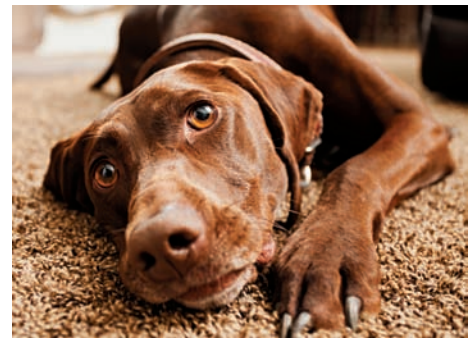
Current concepts in the diagnosis and management of **pyothorax**

Why they did it

A lack of consensus exists on the appropriate approach to managing pyothorax in dogs and cats. Despite the many treatment options, the optimal therapeutic approach is unclear, and the prognosis for successful outcome is variable.

What they did

The authors present an overview of the current literature with respect to the pathophysiology, diagnosis and treatment of pyothorax in dogs and cats. They provide instruction for the placement of a small-gauge thoracic drain.



What they found

Pathophysiology. The origin of pyothorax often remains unknown in dogs and cats, but recent evidence suggests that parapneumonic spread—pleural infection arising as a result of pneumonia or lung abscess—may be the most common route of infection in cats. In dogs on the other hand, the cause of pyothorax may depend more on geographic region (e.g. migration of grass awns in endemic areas). The authors note that infection with feline leukemia virus or feline immunodeficiency virus has not been associated with pyothorax in cats.

Diagnosis. The introduction of bacteria and inflammatory cells into the pleural space and disruption of Starling's forces and lymphatic drainage that govern pleural fluid drainage lead to fluid accumulation. The authors discuss the need for cytologic analysis as well as aerobic and anaerobic bacterial culture of pleural fluid to provide a definitive diagnosis. Polymicrobial infections are common. Common aerobic organisms isolated from feline and canine pyothorax patients include *Escherichia coli* and *Pasteurella*, *Actinomyces*, *Nocardia*, *Streptococcus*, *Staphylococcus* and *Corynebacterium* species. Common anaerobic organisms include *Peptostreptococcus anaerobius* and *Fusobacterium*, *Bacteroides*, *Prevotella* and *Porphyromonas* species.

Sepsis may occur in up to 40% of cats with pyothorax, and cats may present with bradycardia and hypothermia. In addition to thoracic radiographic and ultrasonographic examinations, thoracic computed tomography may be beneficial in assessing patients with pyothorax and identifying the need for surgical intervention (e.g. foreign body, pulmonary abscess). Blood and pleural N-terminal pro-B-type natiuretic peptide (NT-proBNP) concentrations may be useful in differentiating cardiac from noncardiac causes of pleural effusion in cats, but the authors noted that overlapping values between these two groups limit the diagnostic utility of this test in cases of pyothorax.

Treatment. Antimicrobial therapy and thoracic drainage are considered the cornerstone of therapy for patients with pyothorax. Antibiotic selection should be based on culture and sensitivity data when at all possible. Broad-spectrum therapy to address both aerobic and anaerobic pathogens is recommended. Empiric therapy for dogs may include a potentiated penicillin in combination with a fluoroquinolone; monotherapy

GETTY IMAGES/MIKE KEMP

Start a new dialogue about behavior then start Zylkene®.

Because your patients aren't just stressed out. They're stressed within. Your clients don't realize behavior problems aren't just stress-related, they're health-related too. You're the life line for answers and Zylkene is your first line to help pets cope:

- The only veterinary nutraceutical with alpha-casozepine, a natural ingredient derived from casein, a milk protein with calming properties
- Backed by research for behavior problem management in dogs and cats - without drowsiness or sedation
- Can be administered short term for situational stress or used long term
- Palatable, once-daily formulation in three sizes

Learn more at vetoquinolusa.com/zylkene or call 800-267-5707.

Relax, you've got Zylkene®

Vétoquinol *a Sign of Passion*

with a potentiated penicillin may be sufficient in cats. Intravenous administration should be considered until the patient is stable and eating; however, the optimal duration of therapy is unknown and is commonly two weeks past radiographic resolution of effusion.

Mechanical removal of infected pleural fluid is also integral to successful management, but there are no data in veterinary medicine as to which method is superior—needle thoracocentesis versus chest tube placement. Similarly, there is controversy regarding the utility of thoracic lavage or use of intrapleural medications. For patients with thoracostomy tubes, there is a lack of consensus on whether intermittent versus continuous drainage is best. Thoracotomy or video-assisted thoracoscopic surgery may be considered for patients in which there is an indication for surgery (e.g. foreign body) or for patients that do not appear to be responding to aggressive medical management. The ideal type and timing of surgical interventions, however, is unclear.

Take-home message

No evidence-based recommendations or consensus of opinion has been established on the best way to treat dogs and cats with pyothorax. The prognosis is variable, but good outcomes may be achieved with appropriate care. Patients that present with evidence of sepsis or respiratory decompensation have a worse prognosis.

Stillion JR, Letendre J. A clinical review of the pathophysiology, diagnosis, and treatment of pyothorax in dogs and cats. *J Vet Emerg Crit Care* 2015;259(1):113-129.

In-house dipstick tests versus lab results

Why they did it

Confirming the presence of glomerular disease requires assessing a urine protein/creatinine ratio (UPC) ratio. Typically, urine is sent to an outside reference laboratory for this evaluation. The study's authors compared the results from a new veterinary in-house urinary dipstick with those obtained by a veterinary commercial laboratory to see if an in-house urinary UPC could be reliably obtained.

What they did

Between August 2010 and June 2011, the authors collected urine from dogs with proteinuria. Dogs with evidence of infection or inflammation in their urinary sediment were excluded from the study. Urine from each dog was divided into two aliquots—one portion was submitted to a veterinary laboratory for analysis and the other was used for dipstick testing. The urine at the reference laboratory was evaluated with an automated chemistry analyzer. Each dipstick was reviewed by two individuals blinded to the other reviewers' interpretation. All UPC ratios from both methods were converted into data groups to facilitate statistical comparison.

What they found

The researchers analyzed urine from 39 dogs, aged 2 to 15 years old, and found poor correlation between dipstick interpretation and chemistry analyzer results. This lack of correlation was independent of the degree of proteinuria. Notably, agreement between the reviewers of each dipstick was substantial in all but three cases.

Take home message

While larger studies will be required to confirm these findings, use of an in-house veterinary urinary dipstick cannot be recommended at this time for measuring UPCs.

Mamone C, Mitchell M, Beaufrere H, et al. Assessment of a urinary dipstick for determination of urine protein/creatinine ratio in canines. *J Am Anim Hosp Assoc* 2014;50(5):e11-e14.

GETTY IMAGES/VONSCHONERTAGEN

dvm360.com toolkit

June 2015 | dvm360.com/toolkit

end of life

A special monthly package designed to help boost client compliance and make it easy for your team to educate pet owners about regular pet wellness care.

Looking ahead

Navigating the *end-of-life* conversation p7

Tips, tools and resources for mindful, meaningful end-of-life discussions with clients.

TOOLS

Infographic
Prognostic indicators for problem behavior cases

PLUS: Top critical factors to consider before treating or euthanizing p04

Sample script
Sample conversation tips to help you discuss payment for euthanasia with clients p06

Audio
Communicating with grieving pet owners p06

Video
>> How to deliver bad news

>> Making euthanasia easier on veterinary clients

>> Helping to guide end-of-life decisions p07

Handout for clients
Helping pets who have lost their best buddy p08

Sounding off
Expert Q&A: Should housemates be present during euthanasia? p08

PLUS

What Dr. Marty Becker learned from a **funeral director** p2

The **coin jar** exercise p3

What Dr. Marty Becker learned from (human) **funeral directors**

Dr. Becker spoke at a conference for 600 cremation and funeral professionals. Here's his takeaway and what it means for your veterinary practice—plus, additional tips.

When I asked, about half of the group of funeral directors I was speaking to raised their hands to tell me they worked at companies that did services for both humans and pets. And like veterinarians, cremation and funeral professionals have their inside jokes, like, "We're the last ones to 'let you down!'" They were dead serious, however, when they told me that the grief for a pet is much worse than at a funeral for a human.

Shocked, I asked why. They said grieving for people is filtered by family disputes and hidden agendas. With pets, there's none of that, they said—just pure love, loyalty and happiness.

And because there is so much emotion in a pet's passing, they make sure pets and pet owners are cradled in loving, skilled hands throughout the process. Where it all falls apart, they said, is the hand-off from the veterinary hospital to them.

They told me the veterinary community chooses who to use for these services based on cost, or rebates, or seemingly at random. And they gave me three ideas on how to handle the process better:

Visit the pet death-care facilities within a reasonable distance from your practice. Judge the facilities the way clients judge veterinary practices. Look at the exterior. Watch for dead plants, a no-no for a facility that should be celebrating life. Make sure it's clean-looking and doesn't smell bad.

Ask about their process. Find out exactly what happens from the time they pick up a pet until cremation or interment is complete.

Ask about their communication. How does the death-care facility team talk to and meet with pet owners?

If we do things the right way, then we can better guarantee a "good death" to a pet's "good life" and a pet owner's return to your door with their other pets.

Dr. Marty Becker

Signal euthanasias at your practice

We have a very small hospital where laughter and banter carries into the exam rooms, and we needed a way for everybody in our hospital to know when a euthanasia was taking place. One of our technicians made heart-shaped signs to hang on the doors.

They always stay in the door pockets with the white side facing out, until we have a euthanasia or quality-of-life exam. The pink side reads, "Quiet please." When the pink side is facing out, every one is on alert to keep their voices hushed.

—Terina Dobson, office manager
Poland Animal Hospital
Poland, Maine

GETTY IMAGES/BORIS25

Get more tools!
For more tips, tools and exercises like this, go to **dvm360.com/lifesend**.

The **euthanasia** question

When pet owners are struggling with deciding when it's time to euthanize, suggest this exercise.

For a pet owner who knows euthanasia may be on the horizon, deciding when to schedule the appointment can prove as agonizing as the procedure itself. Try this:

> Put two jars on the counter. One jar is for good days and the other for bad days.

> Drop a coin in the proper jar each day to track the pet's well-being.

> If the bad days overwhelm the good days after a week or so, it may be time to consider euthanasia.

Most people know what they need to do before they even begin this exercise. However, once clients make a decision, they tend to doubt themselves, and often on the scheduled day the pet will seem better. It happens all the time, and clients change their minds, only to find sorrow again the next day. In these cases, pose this gentle question...

"Wouldn't you rather your last day together be a happy one?"

GETTY IMAGES/CHONESS

PROGNOSTIC INDICATORS: Treat or euthanize?!

Problem behavior cases examined.

By Lore I. Haug, DVM, MS, DACVB

Prognostic factors are an assumption, not a foretelling. While information can be gleaned from statistical groups, each patient functions in an individualized milieu of physiologic, genetic, and environmental factors. Each case must be evaluated individually because no two situations are identical. Broad generalizations should not be used to determine the value of an animal's life. Many cases have successful outcomes even though the case started with a long list of poor prognostic factors. Similarly, some cases appear to have an excellent prognosis on paper but end in a poor outcome. Admittedly, these prediction failures are frequently influenced most by the owner's lack of dedication to working with the animal.

POSITIVE indicators overall

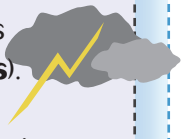
Factors that generally support a more positive prognosis are:

- ✔ There has been no previous intervention for the problem.
- ✔ The animal gives considerable **warning** before biting.
- ✔ The animal demonstrates good bite inhibition (no or minor injury) in most or all episodes.
- ✔ The owner can successfully implement **management steps** and control the animal's environment.
- ✔ The owner is dedicated and compliant.
- ✔ The owner has realistic goals and expectations.

GETTY IMAGES

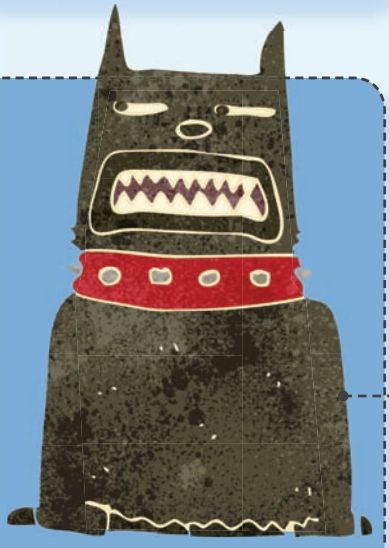
NEGATIVE indicators for anxiety

Relatively poor prognostic factors for anxiety disorders include:



- ✔ The trigger stimuli are such that the animal's exposure cannot be controlled (e.g. **storms**).
- ✔ The animal's anxiety is causing self-injury.
- ✔ There is severe (and costly) property destruction.
- ✔ The owner requires immediate or complete resolution.

NEGATIVE indicators for aggression



Less favorable prognostic factors for aggression cases include:

- ✔ The attacks are unpredictable.
- ✔ Little to no warning is given beforehand. (It is important to distinguish that the animal is truly not giving a warning, not that the owner is just failing to recognize it.)
- ✔ The bites cause moderate to severe injury most of the time.
- ✔ The owner is the target, and the owner cannot control the animal or his or her contact with the animal. (The owner cannot or will not take steps to avoid altercations with the animal.)
- ✔ Multiple triggers for aggression or multiple targets are present.
- ✔ **Young children** are present in a home with a resource-guarding dog.

- ✔ The targeted victims are elderly, handicapped, immunosuppressed, or otherwise ill.
- ✔ The owner is unwilling or unable to make **environmental changes**.

- ✔ The owner is unwilling or unable to make changes in his or her own behavior around the animal.

More tools

Cases involving ending the lives of pets with behavior problems can be some of the hardest you see. Head over to **dvm360.com/decide** for the critical factors you and the owner should consider, as well as concrete steps you can take to come to the right decision.

Scan the code with your mobile device for more...

THE CONUNDRUM *with aggression cases is that the only way to be 100% certain that an animal will bite is when the animal actually does bite. For this reason, we cannot test the success of the behavior program with biting as the measure. Similarly, it is unfair to the animal, the owner, and a potential victim to set up situations that purposely trigger barking, lunging, growling, hissing, swatting, or snapping to test the animal. That means the program's success must be measured in more subtle and, often, less definitive ways.*

HOW TO discuss the cost of euthanasia

Help clients who've made the choice to euthanize their pet by approaching the associated costs with sincere consideration—have your team use this script as a guide.

Start here:

Team member: Now that you've had the chance to speak with Dr. Cares—Is it OK to discuss payment for this procedure now, or save it for later?

Client: Now's OK.

Team member: OK. I can give the estimate now, send you an estimate before the procedure, or send an invoice afterward. Which option works better for you?

Client: I'd rather you sent to me after.

Client: Give me the estimate now.

Client: Send it to me beforehand.

Team member: Sure. We can discuss the invoice when you pick up the cremains, and you can pay then, as well.

Team member: Let's walk through it and address any questions you have. Would you like to prepay for the procedure or pay at the time of the appointment?

Client: I'll prepay.

Client: I'll pay at the appointment.

Team member: Let me walk you to check out. If you change your mind about anything, just let us know and we'll adjust the estimate and rectify your bill.

Team member: Please know that we're thinking of you and your family during this difficult time—we know how special Buddy was to you. We'll help you in whatever way we can.

Team member: Sure. If you change your mind about anything, just let us know and we'll update the estimate and send you a copy so you're aware of the new total before you arrive at the appointment.

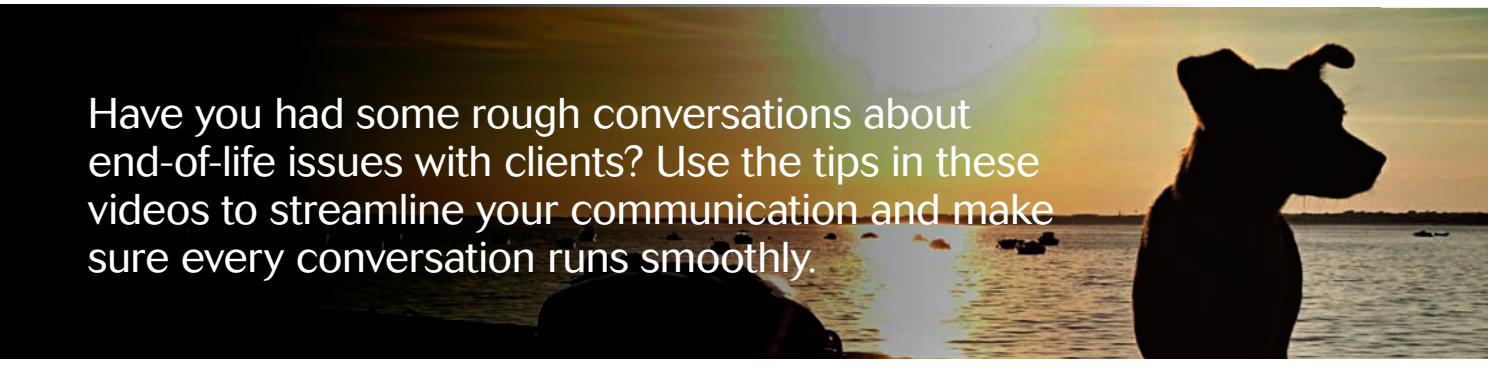
AUDIO: Communicating with grieving clients

Dr. Laura Garrett, a board-certified veterinary oncologist, explains how understanding the stages of grief can prevent you from taking clients' reactions to bad news personally. Scan the code to hear her tips now or listen later at **dvm360.com/lifesend**.

GETTY IMAGES

To view these videos and more tools, visit **dvm360.com/lifesend**.

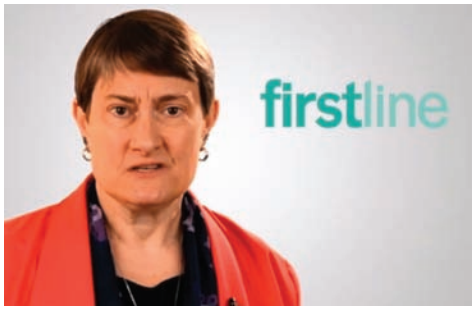
Looking ahead



Have you had some rough conversations about end-of-life issues with clients? Use the tips in these videos to streamline your communication and make sure every conversation runs smoothly.

People put a lot of stock into how tough conversations are handled by their doctors—and pet owners are no different. In fact, you or your team probably experience many highly charged emotional conversations. To help you manage, try these four core communication skills, provided by veterinary oncologist Dr. Laura Garrett. She offers tips on what to say and how to say it best.

Scan the QR code to better your skills now



Empowering pet owners during difficult times

End-of-life decisions about pets are inherently emotional, but there are tools you can use to ease the pain. Dr. Robin Downing says you can make things better by empowering and informing pet owners throughout the difficult event.

Scan the code, above, to learn how to empower clients to make a decision

Scan the code for a tool to teach clients about a pet's quality of life.

GETTYIMAGES/EYEEM

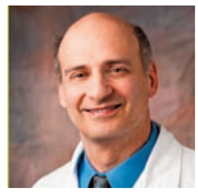
Get more tools!
For the handout below and more tools to help you navigate end-of-life conversations, go to **dvm360.com/lifesend**.

Sounding off:
Should housemates be present during euthanasia?

A veterinarian asked us: When two dogs share a close bond and one is going to be euthanized, should the surviving dog witness the event?

Our expert said:

It is common for pet owners to report that after the loss of a pet in the household, one or more of the remaining pets went through a period of what can only be described as depression. What is not clear is whether having another pet present during euthanasia makes a difference in the length or severity of the depressed state or the probability of its occurring. My suspicion is that it will likely not have much impact one way or another on the remaining pet's attitude after the death of its housemate. This, however, is pure conjecture on my part. I would suspect that having the remaining pet present comforts the owner and helps make the situation a bit more bearable, thereby reducing the family's level of anxiety. Since we know that pets are good at picking up on the emotions of people in their circles, it is quite possible that the relaxation in owners provided by the presence of a remaining pet during a euthanasia may result in a calmer attitude in the pet itself.



John Ciribassi, DVM, DACVB

Losing a buddy

Have multiple-pet-owning clients who have recently lost a member of the family? Give them this handout with tips to ease the pain.

FROM YOUR VETERINARIAN

Helping pets who have lost their **best buddy**

Losing a housemate can be hard on the entire family—including your other pets. Here's what you can do to help.

To download the handout now, scan the QR code, right.

And our readers responded with quite a few thoughts on the subject! Here are some snippets:

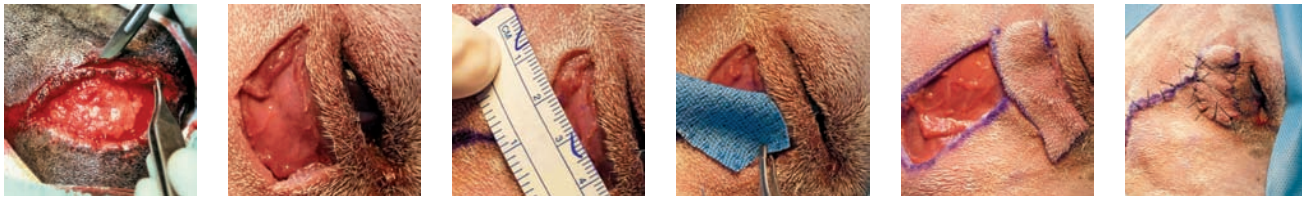
"When I do home euthanasias, the other pets are almost always around. I don't think this diminishes the mourning some pets go through, but I do think it reduces that aimless wandering all through the house. We know they sense what has happened and "know" the other pet has died.

—Susan McMillan, DVM, JD"

"I have always counseled owners who have animals with a close bond to allow the surviving pet to at least see and smell the body of the deceased pet. Although it isn't always possible to do so, I truly believe this action helps, and on some level the animals seem to "get it."

—Stephanie A. Burk, DVM"

To read more letters to the editor on performing euthanasia with another pet present, go to **dvm360.com/lifesend**.



Wound repair techniques
Transposition flaps

Consider performing this reconstruction technique the next time you need to repair a square or rectangular wound and direct closure could result in the distortion of a body structure—or when skin for closure is only available on one side of the wound. *By Steven F. Swaim, DVM, MS*

A transposition skin flap is a segment of skin and subcutaneous tissue or panniculus muscle (e.g. cutaneous trunci) that is lifted and has its orientation shifted as it is placed onto a wound. Thus, the flap is transposed to close the wound.

Transposition flaps are generally rectangular in shape and lend themselves well to the closure of square or rectangular wounds. The flap turns on a pivot point to reach the nearby defect. It may be directly adjacent to the defect (*Figures 1A-1C*) or at any angle up to 180 degrees to the defect. However, increasing the angle results in a decrease in effective flap length and increases skin folding at the flap base and the possibility of kinking the flap's blood supply. Thus, 90 degrees is the usual upper limit to flap design related to the defect.

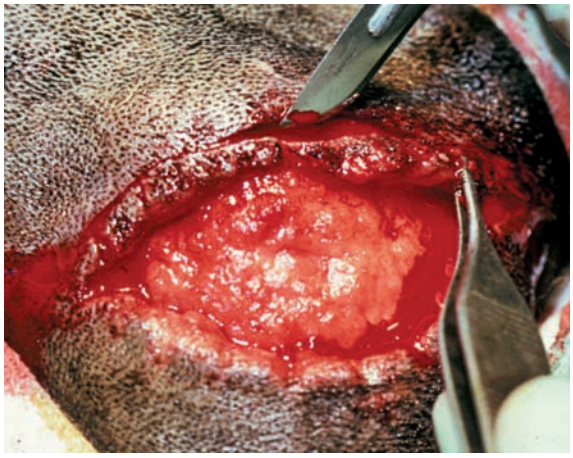
Adequate skin for repairing a defect may not be available in the plane of the defect; for example, skin may only be available on one side of the defect, eliminating the possibility of a bipedicle advancement flap. In addition, direct closure (stretching skin) could result in distortion of a body structure (e.g. eye or anus). Thus, when skin is not available in the plane of the wound but skin is available in a nearby plane, a transposition flap can be used to close the defect.

PREOPERATIVE WOUND TREATMENT

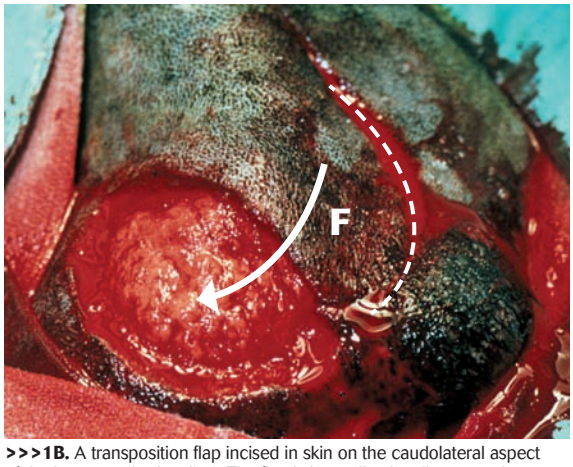
Treat the wound as an open wound until contamination is eliminated, debris is removed and infection is controlled. Use staged débridement and lavage to remove definitely nonviable tissue and debris at each bandage change. This tissue will be white, black or not attached to the wound and will have no blood supply. Leave tissue with questionable viability, and reevaluate it the next day.

Perform wound lavage simultaneously with débridement. Physiologic saline solution or a 1:40 dilution of 2% chlorhexidine diacetate or gluconate solution in sterile water should be used for lavage. A 30-ml syringe with an 18-ga needle delivers lavage solution at 17 to 18 psi (± 7 to 10 psi). An alternative technique for delivering lavage solution is to pressurize an intravenous bad of fluids to 300 mm Hg with a pressure cuff and deliver the fluids via a 22- to 16-ga needle on a standard intravenous drip set. This provides a pressure of 7.1 to 7.3 psi (±0.1 psi).[1]

Topical antibacterial medication (e.g. silver sulfadiazine, povidone-iodine, chlorhexidine, nitrofurazone) may not be necessary, but if it is needed, it can be applied to the wound. Although



>>>1A. Débriding the edge of a wound over the left lateral epicondyle of the humerus.



>>>1B. A transposition flap incised in skin on the caudolateral aspect of the humerus (*broken line*). The flap is immediately adjacent to the wound (F = transposition flap). The direction of the flap rotation is indicated by the arrow.

>>>1C. A transposition flap sutured in place over the wound.

some topical medications can have a negative effect on certain stages of wound healing, the main concern during the inflammation-débridement phase of wound healing is controlling infection. In some cases, systemic antibiotics may be indicated for infection control.

Topical wound healing stimulants can also be applied. The repair stage of wound healing is stimulated, as reflected by the early appearance of granulation tissue. Examples of topical wound healing stimulants include an acemannan-containing gel (Carravet Acemannan Wound Gel—Carravet), a maltodextrin NF D-glucose polysaccharide (Intracell—MacLeod Pharmaceuticals) and a tripeptide copper complex (Iamin Hydrating Gel Wound Dressing—Folica).

ADVANTAGES AND DISADVANTAGES

Flaps have the advantage of carrying their blood supply with them to maintain their viability. Thus, they can be placed over less-than-optimal wound beds, such as exposed bone or irradiated tissue. However, if a healthy bed of granulation tissue can be produced over such tissue, additional vascularization can invade the dermal surface of the flap.

Transposition flaps also have the advantage of providing tension relief when they are used to close a defect in which skin is available on only one side of the defect. When nearby skin is available in a different plane than the defect is in, the greater the angle between the wound and the skin for the proposed flap, the less the tension at the repair site.

One disadvantage of transposition flaps is that they lose effective length the more they are rotated (*Figure 2*). However, that can be compensated for when designing the flap by extending its length. Even with this compensating procedure, there will be occasions when the location of a wound will preclude lengthening the flap (a body structure will not allow for appropriate flap

lengthening). For example, in *Figure 1*, lengthening the adjacent flap would have required cutting into skin over the point of the olecranon with the risk of developing of a chronic wound over this pressure point. The elasticity of the dog's skin may allow for the flap design to be somewhat less than the ideal length and still provide wound closure without excessive tension.

Another potential disadvantage of transposition flaps is the development of a large dog ear at the base of the flap. If the dog ear does not regress over 14 to 21 days, then a second surgery may be necessary to correct it. As with other types of reconstructive surgery, dog-ear correction requires creating a wound to correct a wound.

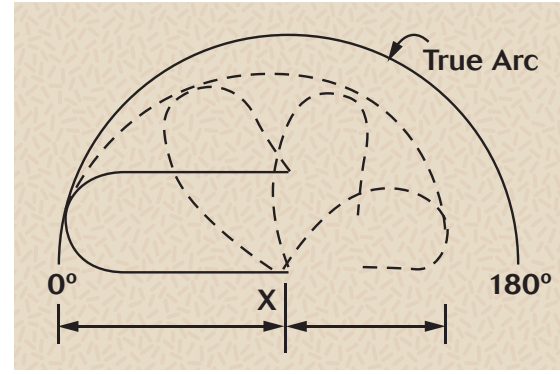
A minor disadvantage of transposition flaps is that the hair growth direction on the flap may differ from the surrounding hair because of the rotation of the flap during transposition.

FLAP DESIGN

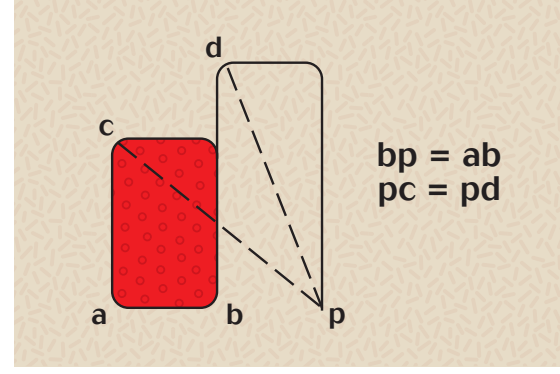
When designing a transposition flap, two measurements can help ensure that the flap is the proper width and length. First, the width of the flap should be the same as the width of the wound. Second, from the standpoint of length, diagonal measurements should be made to provide a flap length that will compensate for the loss of effective length as the flap is rotated into position over the wound. The diagonal from the pivot point of the flap to the far corner of the wound should be equal in length to the diagonal from the flap's pivot point to the opposite corner of the flap. These measurements hold true whether the flap is directly adjacent to the wound or at a right angle to the wound (*Figures 3A & 3B*).

Survival of the entire flap depends on having adequate blood supply for its full length. Length-to-width ratios have been stated for flaps to help ensure sufficient vascularity. However, "specific recommendations for flap length to width are not possible because blood supply varies among individuals and regions of the body."[2] If a flap undergoes avascular necrosis, the part of the flap that dies is the part that is needed most—the end of the flap. When this occurs, my approach to the problem is to remove the devitalized tissue and consider another form of reconstruction for the open area (e.g. healing by second intention, mesh graft or pinch/punch grafts).

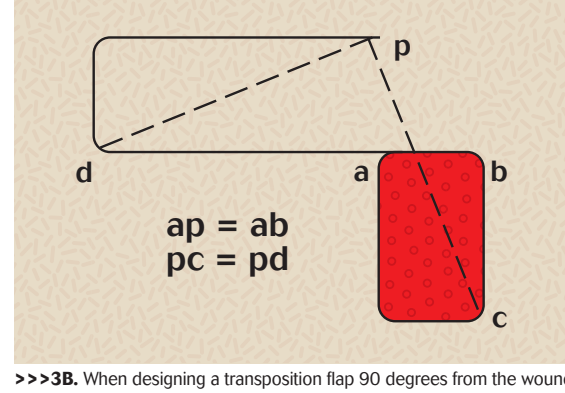
Once the flap has been drawn on the skin, manipulating a piece of sterile cloth or sterile paper covering from surgical gloves the size of the flap and the underlying skin can help confirm that the flap design will provide sufficient skin for defect repair and closure of the flap donor site (*see Steps 5 and 6, pages 164 and 166*).



>>>2. The rotation of the transposition flap around a pivot point (X) results in a loss of effective length the more the flap is rotated. (Adapted from Grabb WC. Classification of skin flaps. In: Grabb EC, Myers MB, eds. *Skin flaps*. Boston: Little, Brown and Co, 1975;149.)



>>>3A. When designing a transposition flap adjacent to the wound, the flap's width should be equal to the width of the defect (bp=ab). The diagonal length from the flap's pivot point to the far point of the wound (pc) should be equal to the diagonal length of the flap from the pivot point (pd). (Adapted from Swaim SF, Henderson RA. *Small animal wound management.* 2nd ed. Baltimore, Md: Williams and Wilkins, 1997;258.)

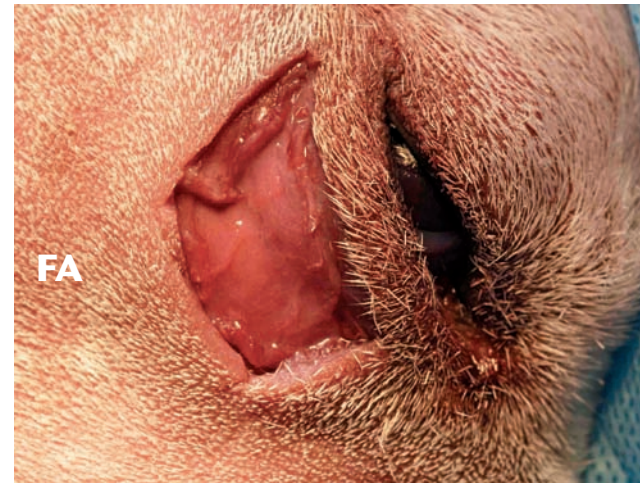


>>>3B. When designing a transposition flap 90 degrees from the wound, the flap's width should be equal to the width of the defect (ap=ab). The diagonal length from the flap's pivot point to the far point of the wound (pc) should be equal to the diagonal length of the flap from the pivot point (pd). (Adapted from Swaim SF, Henderson RA. *Small animal wound management.* 2nd ed. Baltimore, Md: Williams and Wilkins, 1997;258.)

How to perform a transposition flap

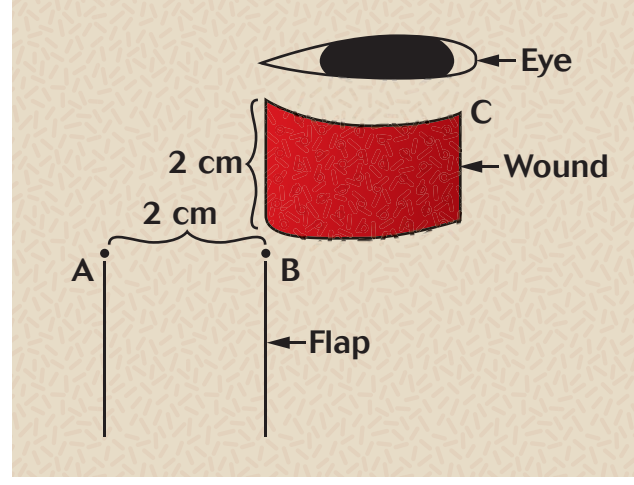
After anesthetizing the patient, position it so that the wound and a large area of surrounding skin can be clipped and prepared for aseptic surgery. It is preferable to err in favor of preparing too large of an area rather than too small. If an insufficient area is prepared, the unprepared area may be pulled from under the surgical drapes during wound closure.

Protect the wound area from hair clippings and preparation solutions by placing sterile lubricant and protective gauze on the wound surface. In the cadaver demonstration shown in this article, the basically rectangular wound is below the right eye.



Step 1

Manipulate the wound edges to see if direct closure is possible or if it could result in ectropion. If direct closure is not an option, look for skin that you can transpose onto the wound (FA = flap area). In this case (*see top photo*), there is available skin for a flap in the lateral caudal cephalic area behind the eye.

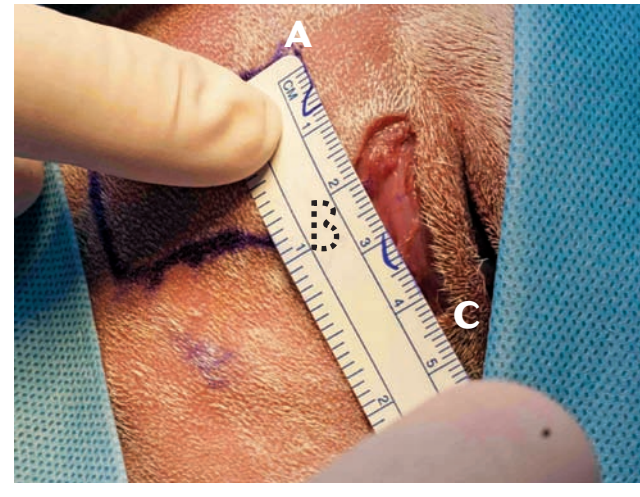


Step 2

Design the flap on the skin at the caudoventral aspect of the defect. The width of the wound is 2 cm, so the flap width needs to be 2 cm. Mark this measurement at the caudoventral corner of the wound, thus establishing the width of the flap at its base (*distance from A to B in middle photo*). Draw two parallel lines, 2 cm apart, ventrally on the skin from the measured width marks (*distance from A to B in middle photo*) at the flap's base.

Step 3

Measure the diagonal from the pivot point of the flap to the far corner of the wound (*distance from A to C in bottom photo*).



"These are **not your typical** continuing education courses. CVC and the great minds behind *Veterinary Economics* and *Veterinary Medicine* are bringing **exclusive new, innovative** session tracks to Kansas City."

Brendan Howard,
***Veterinary Economics* Editor,**
Business Channel Director

whole team, whole practice ontinuing education sessions

That support the way you practice veterinary medicine

dvm360 Full Circle seminars hot topics, dynamic speakers, and clinical, practice management and practice team perspectives

Learn then Earn connects modern medicine and practice management into an actionable package

Your Practice Presence: Get Online and Go Off the Chart digital media marketing ideas that work for veterinary practice

In this Case: Real Discussions, Real Results two experts combine to offer solutions to your confounding clinical cases

Expert²: The Power of Interaction fresh treatment strategies created from shared thinking, electronic polling, and group problem-solving

It's exceptional continuing education you won't want to miss!
Register before July 15 and save!

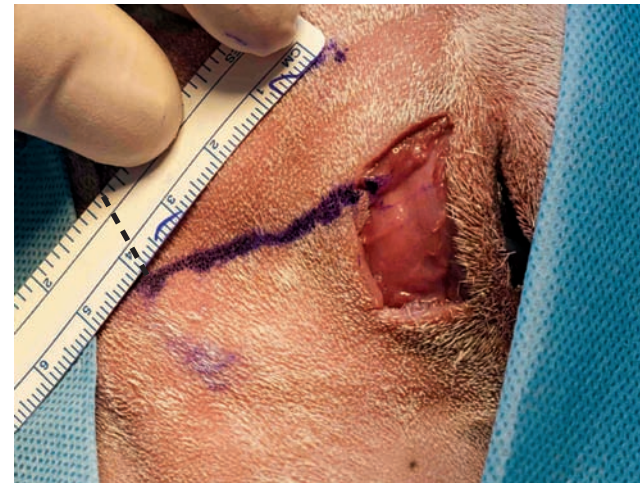
unCVC conventional

KANSAS CITY
AUGUST
28–31, 2015

CALL 800.255.6864, ext. 6 **CLICK** TheCVC.com **EMAIL** cvc@advanstar.com **FOLLOW**

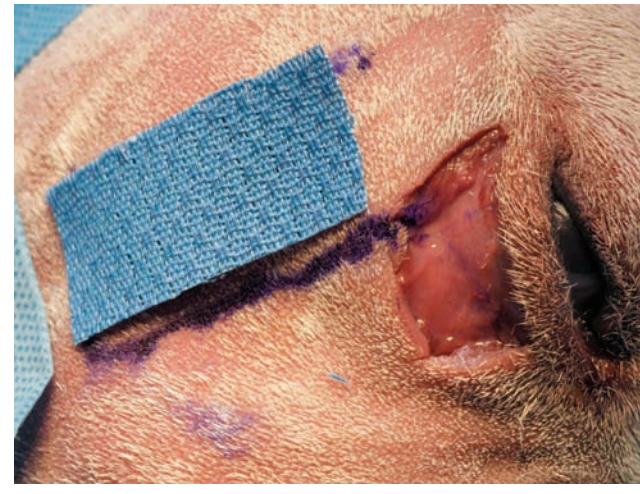
Step 4

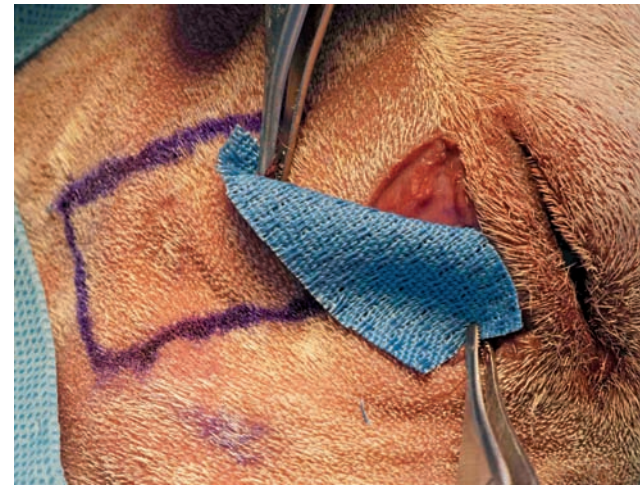
Measure the length of the diagonal in Step 3 from the pivot point of the flap to the cranial-most line of the two parallel lines forming the flap edges. From this point, draw a line to connect the cranial and caudal lines of the flap to create a squared end on the flap (*see broken line in top photo—the line is under the ruler*).



Step 5

To confirm that the flap is long enough to cover the defect, lay a piece of sterile cloth the size of the flap over the drawn flap (*see middle photo*). Hold the portion of the cloth over the base of the flap tightly against the skin while rotating the other end of the cloth over the wound (*see bottom photo*).





From Eureka to Action

Why and How to Create a Fear-Free Practice

Dr. Marty Becker is on a mission to make Fear-Free veterinary visits a reality for pets. He's outspoken about the need, and his message is eye-opening. In this symposium, you'll learn how to use Fear-Free concepts to:

- put animals and owners at ease
- deliver a higher level of compassionate care
- earn repeat visits.

You will also receive a copy of the new brochure *"Top 10 Ways to Get Started with Fear-Free Veterinary Visits"*

Marty Becker, DVM
Fear-Free tools to transform patient interactions, boost visits, and enhance your practice.

Lisa Radosta, DVM, DACVB
Fear-Free techniques: Clinical behavioral evidence that they work.

Jonathan Bloom, DVM
Modern Love — Making pets happy at the veterinary hospital.

FEAR-FREE PRACTICE SYMPOSIUM

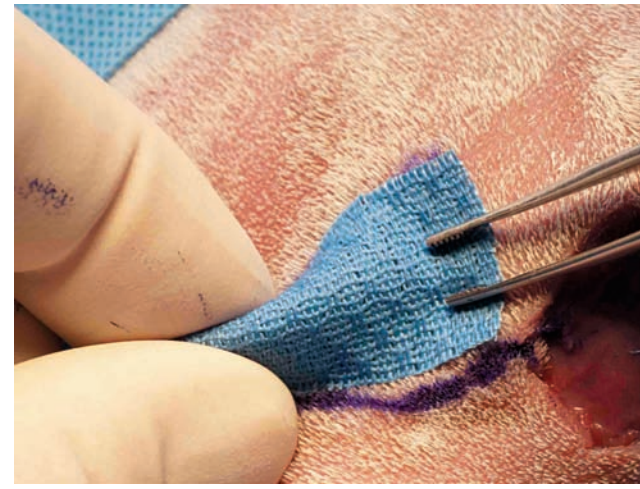
Sunday, August 30, 2015
8:00 AM - 12:15 PM
Kansas City Convention Center
Visit TheCVC.com for details.

Proud sponsors of the **Fear-Free** Initiative

Boehringer Ingelheim · Ceva · Elanco

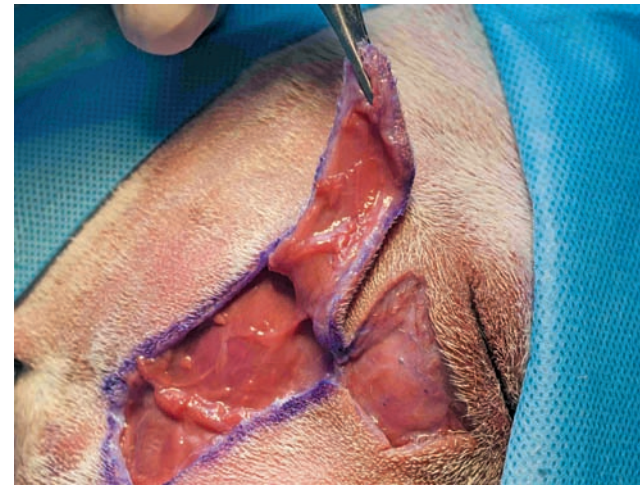
Step 6

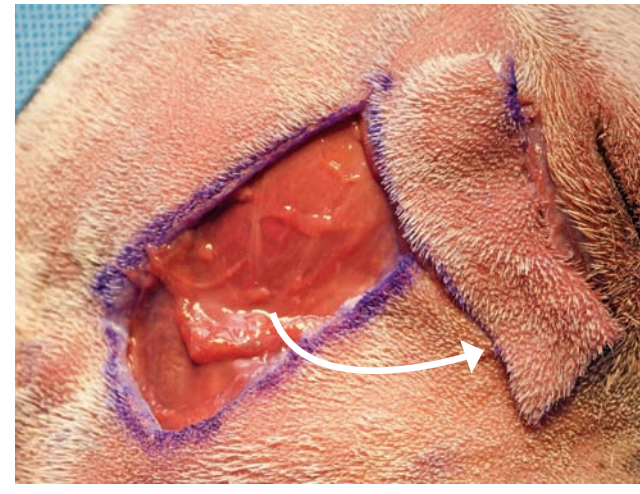
To confirm that the flap donor site can be closed after the flap is transposed, hold the cloth over the base of the flap firmly in place while pinching together the cloth and underlying skin of the flap (*see top photo*).



Step 7

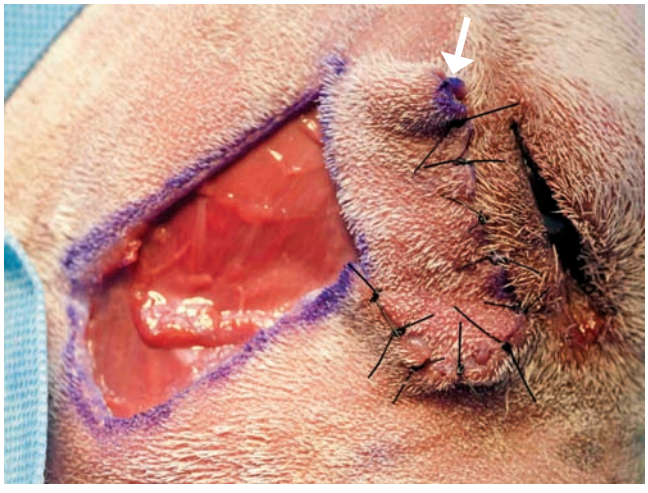
Incise the flap along with any underlying panniculus muscle. Undermine and elevate the flap as needed (*see middle photo*). Then rotate the flap into position over the wound with no tension (*arrow in bottom photo*).





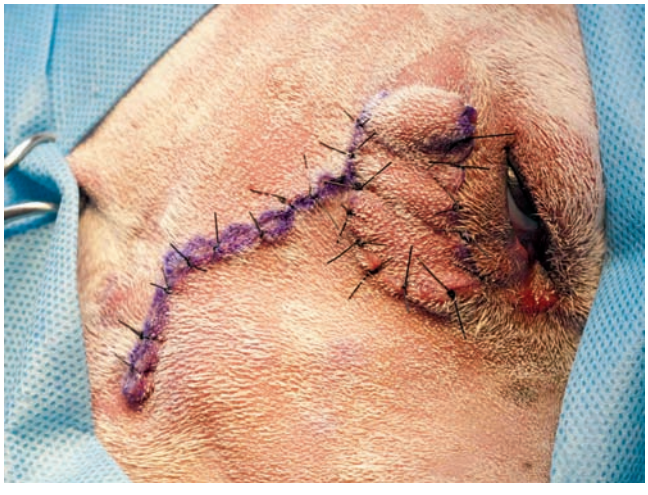
Steven F. Swaim, DVM, MS
Professor Emeritus
Scott-Ritchey Research Center
Department of Clinical Sciences
College of Veterinary Medicine
Auburn University, AL 36849

See more wound repair techniques from Dr. Swaim at **dvm360.com/woundrepair**.



Step 8

Suture the flap into place with simple interrupted sutures of 3-0 monofilament polypropylene. If a dog ear of skin forms at the base of the flap on the edge opposite the pivot point (*see arrow in top photo*), leave it alone for now (*see* **dvm360.com/dogears** *for more instruction on dog ear correction techniques*).



Step 9

Suture the donor site with simple interrupted sutures of 3-0 monofilament polypropylene (*see bottom photo*). If necessary, undermine around the donor site to allow for a tension-free closure. Dead space under a flap is best managed by placing a drain under the flap. Placing tacking sutures under a flap could cause occlusion of important blood vessels, resulting in avascular necrosis.

POSTOPERATIVE CARE

If you are concerned about the patient molesting the surgical site or if a drain has been placed under a flap, cover the area with a bandage, if possible. You can use a tie-over bandage in difficult-to-bandage areas. If the surgical site is in an area that cannot be bandaged, having the patient wear an Elizabethan collar can prevent wound molestation. If a drain is present, assess the amount and nature of drainage at each bandage change. When the drainage has decreased to a small amount, usually within three or four days, remove the drain.

Correcting dog ears at the time of flap creation is not necessary and may be contraindicated. It could damage the blood supply to the flap, thus jeopardizing flap survival. If left for 14 to 21 days after flap creation, some dog ears—usually small ones—will flatten and not need surgical correction. If dog ear correction is necessary, several techniques are available (*see* **dvm360.com/dogears** *for a guide to correcting dog ears*). VM

References

1. Gall TT, Monnet E. Evaluation of fluid pressures of common wound-flushing techniques. *Am J Vet Res* 2010;71:1384-1386.

2. Hunt GB. Local and subdermal plexus flaps. In: Tobias KM, Johnston SA, eds. *Veterinary surgery: small animal*. St. Louis, Mo: Elsevier/Saunders, 2012;1243-1255.

Suggested reading

1. Hedlund CS. Large trunk wounds. *Vet Clin North Am Small Anim Pract* 2006;36:848-872.

2. MacPhail CM. Surgery of the integumentary system. In: Fossum TW, ed. *Small animal surgery*. 4th ed. St. Louis, Mo: Elsevier/Mosby, 2013;190-288.

3. Pavletic MM. *Atlas of small animal wound management and reconstructive surgery*. 3rd ed. Ames, Iowa: Wiley-Blackwell, 2010.

4. Swaim SF, Henderson RA. Various shaped wounds. In: *Small animal wound management*. 2nd ed. Baltimore, Md: Williams and Wilkins, 1997;235-274.

DENTAL PRODUCTS

ANESTHESIA EQUIPMENT

MEDICAL EQUIPMENT

DIAGNOSTIC TESTING

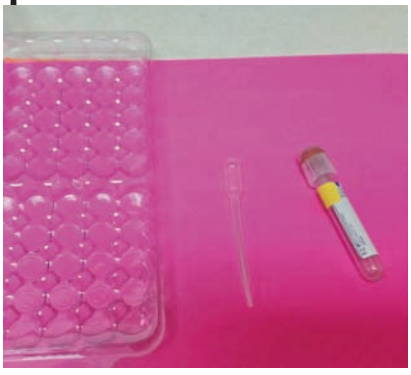
TAGS

VETERINARY POSITIONS AVAILABLE

WEST VIRGINIA

Faculty Position – Veterinarian. Clinical Assistant/ Associate Professor of Veterinary Medicine, West Virginia University. The position is Clinical Assistant/ Associate Professor of Veterinary Medicine in the WVU Davis College of Agriculture, Natural Resources and Design in Morgantown, WV. This is a twelve-month, non-tenure-track position divided among 85% clinical responsibilities and 15% teaching. Will provide the veterinary care program and clinical treatment of livestock and poultry to include herd health, medicine and surgery located on DCANRD farms located in Morgantown, Reedsville and occasionally other off campus farms. Provide Veterinary Service and Consultation to the Food Animal Research Facility located on Stewartstown Road, Morgantown for West Virginia University Health Sciences. Teach a course a semester related to Large Animal Veterinary Medicine at the farm, assist in teaching Animal production and Animal Science laboratories. Must have a DVM with experience and interest in food animals. Must have or be able to obtain a temp vet license in WV. Send application materials as a pdf to damackenzie@mix.wvu Review of applications will begin 6/15/15. WVU is an EO/AA employer.

Simplify the urine sample process with a **urine catch kit**



We send owners home with urine catch kits if we were unable to obtain urine at the patient appointment. The kits include a urine catch tray, a pipette and a urine tube marked with the owner's name, the patient's chart number and a paid label—all in a laboratory bag. When the owner collects a urine sample, he or she can drop the sample off at the front desk without having to wait for the chart to be pulled up. All we have to do is fill out the laboratory paperwork and put the sample in the fridge.

Dawn Elza, LVMT
Nashville, Tennessee

Orville Redenbacher probably never imagined *this*

To make it easier for owners to catch feline urine samples at home, we suggest they replace their cats' litter boxes with a clean box filled with unpopped popcorn kernels. The popcorn is similar to kitty litter in texture but doesn't absorb urine. After a cat uses this litter box, the owners can easily pour the urine into a container and then bring it to the clinic for analysis. We have had great success with this method.

Laura Wiglusz, LVT
Melissa Campbell, assistant
Beth McCrea, receptionist
Grand Island, New York

We need your ideas!
We'll pay $50 for regular submissions and $75 for videos that we publish in print or online.

Email vm@advanstar.com, fax us at (913) 273-9876, or write to Idea Exchange Editor at 8033 Flint, Lenexa, KS 66214.

Read Dr. Miller online

We need nurses

Should we call veterinary technicians *nurses*? Dr. Miller discusses his views on this topic, which continues to be debated, in a past column at **dvm360.com/miller**.

Also online…

Dr. Jennifer Wardlaw presents the latest research on gastric dilatation-volvulus at **dvm360.com/gdvupdate**.

GETTY IMAGES/JON STOKES

More Berries for the Buck!

At just **half the cost** per tablet of the leading competitor, **CranMate® Nutritional Supplement** is the cost-effective solution for supporting urinary health in your patients.

- Rich in A-type PACs (proanthocyanidins) and antioxidants
- Enhances natural mechanisms for flushing out harmful bacteria
- Free of unwanted sugars and oxalic acid
- Convenient daily dosing of palatable chewable tablets: 1 tablet per 44 lbs.

Recommend the Best Value in Cranberry Supplements: CranMate®

From the makers of PROIN® (phenylpropanolamine hydrochloride)

PRN PHARMACAL

800.874.9764 • prnpharmacal.com

Hill's

OBESITY + FLUTD

Let's treat them **together**

REDUCES BODY WEIGHT BY 11% IN 60 DAYS[1]

REDUCES THE RECURRENCE OF FIC SIGNS BY 89%[2]

NEW PRESCRIPTION DIET®
Metabolic+Urinary

Meet the world's only proven single solution for both.
Together we can help all of your patients at risk.

For more information, talk to your Hill's Representative.

[1]Data on file. Hill's Pet Nutrition, Inc.
[2]Kruger JM, Lulich JP, Merrils J, et al. *Proceedings.* American College of Veterinary Internal Medicine Forum 2013.

HillsVet.com