

2023 Technical Staff Symposium







PLATINUM







GOLD









SILVER



























BRONZE









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TECHNICIAN SPEAKER SCHEDULE

9:00 AM - 10:00 AM REGISTRATION & BREAKFAST | SPONSOR TABLES OPEN



10:00 AM - 10:10 AM
OPENING REMARKS
CATHERINE HUFF, LVT | PROCEDURAL SERVICE MANAGER



10:10 AM - 11:00 AM
URINE, WHERE DOES IT COME FROM, AND WHAT CAN IT TELL US
CATHERINE HUFF, LVT | PROCEDURAL SERVICE MANAGER



11:05 AM - 11:55 AM
CARING FOR THE MOST CRITICAL PATIENTS FIRST: THE ART OF TRIAGE
RHONDA DIXON, DVM | EMERGENCY

12:00 PM - 1:00 PM LUNCH | SPONSOR TABLES OPEN



1:10 PM - 2:00 PM BLOOD PRODUCTS & TRANSFUSION MEDICINE FOR THE VETERINARY TECHNICIAN ALEXIA FRENCH, LVT



2:05 PM - 2:55 PM SCIENCE BEHIND COMPASSION FATIGUE & BUILDING RESILIENCY DR. JEANNA WENDT | ZOETIS

3:00 PM - 3:25 PM AFTERNOON BREAK | SPONSOR TABLES OPEN



3:30 PM - 4:20 PM A BALANCING ACT: CULTIVATING CULTURE SAMANTHA HULBIG, LVT | STAFF SCHEDULING COORDINATOR



4:25 PM - 5:15 PM
CARDIAC ANATOMY AND THE INTERPRETATION OF COMMON ELECTRICAL AND MUSCULAR ABNORMALITIES
CATHERINE HUFF, LVT | PROCEDURAL SERVICE MANAGER



CATHERINE HUFF, LVT, BAS, PROCEDURAL SERVICES MANAGER



DR. RHONDA DIXON, DVM



ALEXIA FRENCH, LVT



DR. JEANNA WENDT, DVM, ZOETIS



SAMANTHA HULBIG, LVT, STAFF SCHEDULE COORDINATOR

Urine: Where does it come from and what can it tell you?

Catherine Huff, LVT, BAS

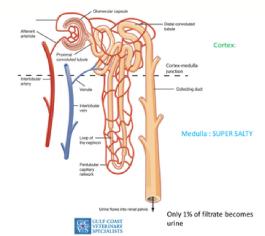




Anatomy of the nephron

The functional unit

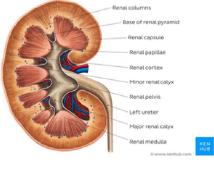
- Afferent (arrive)
- arteriole
 Efferent (exit) arteriole
- Glumerulous
 Proximal convoluted Proximal convoluted tube
 Loop of Henle
 Distal convoluted tube
 Collecting ducts
 Peritubular caps



Macro-anatomy

- Cortex vs medullaRenal pyramidCalyx







Urinalysis

Sterile vs non-sterile

- · Physical inspection : color, smell,
- · Dip Stick: blood, ketones, gluc, protein, pH, etc
- Refractometer: concentration
- Microscopic inspection: centrifuge sample in conical urine tube



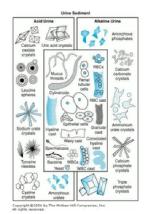


Commonly Seen:

Struvite (triple phosphate): can appear in refrigerated samples Calcium oxalate (dihydrate) Cystine (not radiotranslucent) Urate (dalmations) Blood cells (red and white) Epithelial cells: cornified, non cornified, transitional Bacteria/yeast

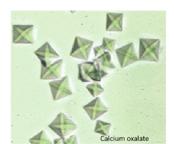
Casts

Sperm: most commonly seen if sample taken from first urination of the day





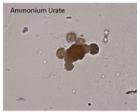








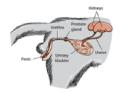






- Originate solely in the kidney 4 criteria needed for formation
- High salt concentration
 Acidic pH
 Reduced tubular flow
 mucoprotein

- Hyaline may be seen with mild kidney disease
 Blocked Tom dx can result from casts or
- crystals



Casts in Urine:



























Questions?









Derived from the French word "trier"—to sort, pick out or separate from others In a medical setting The sorting of and allocation of treatment to patients according to a system of priorities designed to maximize the number of survivors The sorting of patients (as in an emergency room) according to the urgency of their need for care

E CLASSIFICATION (CHART
Description	Examples:
Patient Critical Treatment must be initiated within seconds to minutes	Cardiopulmonary arrest, Major bleeding, breathing problems, altered mentation, shock, history of toxin ingestion, active seizures, anaphylaxis
Patient Urgent Currently stable, but may become ast priority patient, need to be reassessed, or have treatment initiated within minutes to hours	History of major trauma, history of unsuccessful urination, repeated vomiting or diarrhea, some toxin ingestions, some fever patients
Patient Stable Pressing problem that is non-critical Treatment initiated within hours	Fever, lacerations, open fractures, vomiting, diarrhea (no shock or altered state of mentation)
Patient Completely, Stable Needs evaluation, requires action in the next 24+ hours	Minor skin issues, ear infections, most limping patients
	Patient Critical Treatment must be initiated within seconds to minutes Patient Urgent Currently stable, but may become ast priority patient, need to be reassessed, or have treatment initiated within minutes to hours Patient Stable Pressing problem that is non-critical Treatment initiated within hours Patient Completely. Stable Needs evaluation, requires action in the next 24+

The Golden Hour • First 1+ hours after presentation • Identify life threatening problems and start treatments to mitigate consequences • BE PROACTIVE • ANTICIPATE

PATIENT ASSESSMENT Started by technician/triage team - Quick history; more thorough history later - Obtain vitals Concurrent assessment by DVM ID life threatening problems/injuries Airway, Breathing, Circulation, Neurological



Normal vs labored Increased vs decreased rate Localization of problem—upper airway vs lower airway vs pleural space vs parenchymal Look Alikes/Honorable Mentions Always OK to give oxygen

RECOGNIZING RESPIRATORY PATTERNS UPPER AIRWAY: • Exaggerated or prolonged inspiration effort with little to no air movement • Oz supplementation is not effective, therefore immediate invasive measures are indicated (sedation/anesthesia, intubation, positive pressure ventilation) • Emergency tracheostomy may be indicated if intubation not feasible • Laryngeal paralysis, brachycephalic airway obstructive syndrome, collapsing trachea, foreign body, neoplasia

RECOGNIZING RESPIRATORY PATTERNS SMALL AIRWAY/LOWER AIRWAY • Wheezes or whistles may be heard • Most likely to be a cat vs dog • Cats will present with a pronounced expiratory push, normothermic and normotensive • Oxygen supplementation, bronchodilators (albuterol inhaler, terbutaline), steroids, sedation? • Examples: Feline asthma, chronic bronchitis (dog)

RECOGNIZING RESPIRATORY PATTERNS PLEURAL SPACE DISEASE • Asynchronous or restrictive pattern • Dull or absent lung sounds • TFAST—fluid vs. air vs. organs vs mixture • Pleural fluid (pyothorax, chylothorax, hydrothorax, neoplasia) • Air—pneumothorax (trauma, spontaneous) • Diaphragmatic hernia—recent trauma?



Recognizing Respiratory Patterns PARENCHYMAL DISEASE

- · Diseases that affect the terminal and respiratory bronchioles, interstitium, alveoli, or vasculature of the lung
- · Infiltration with microorganisms, inflammatory or neoplastic cells
- · Airspaces may be filled with edema, or foreign material
- · Or Lung tissue may be replaced by fibrotic tissue
- · Examples: Infectious pneumonia, aspiration pneumonia, pulmonary fibrosis, CHF, NCPE, pulmonary contusions, or neoplasia



RECOGNIZING RESPIRATORY PATTERNS

LOOK ALIKE/HONORABLE MENTIONS

- Decreased O2 delivery—secondary to poor cardiac output
 Cardiac arrythmias

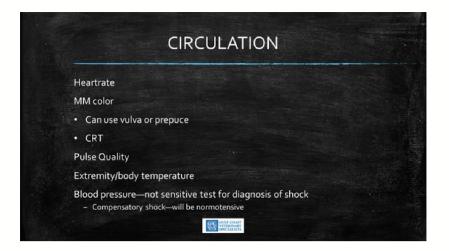
 - o Hypovolemia
 - o Pericardial effusion
- Stress/anxiety/pain
- Reverse Sneeze
 Acid-base disturbances—metabolic acidosis (uremia, ketoacidosis, ethylene glycol intoxication)
- Hyperthermia
- · Neurological Disease intracranial diseases affecting brain stem, or cerebral cortex; Cheyne-Stokes, gasping/chaotic respirations, central neurogenic hyperventilation



OXYGEN DELIVERY METHODS









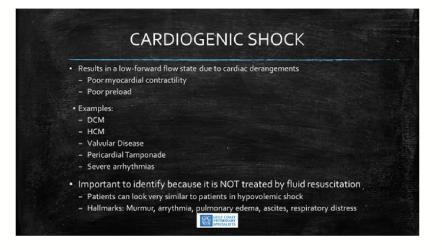
Shock vs Dehydration SHOCK Tissue hypoperfusion Hypovolemic (hemorrhage, dehydration, 3rd spacing) Distributive/Vasodilatory (sepsis, SIRS, anaphylaxis) Cardiogenic (CHF, arrythmia) Loss of water from interstitial space Untreated/unresolved dehydration can lead to shock, but they are not interchangeable

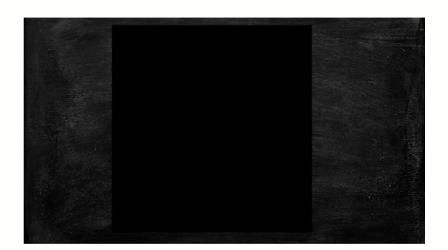
• Most common shock seen in dogs/cats • Dogs tend to have more predictable progressive changes in their cardiovascular status in response to volume depletion - heart rate - mucous membranes color - 'capillary refill time - pulse pressure profile • Hemorrhage, fluid losses (e.g., from GI tract) or third spacing • Goal of therapy is to restore perfusion by increasing intravascular volume

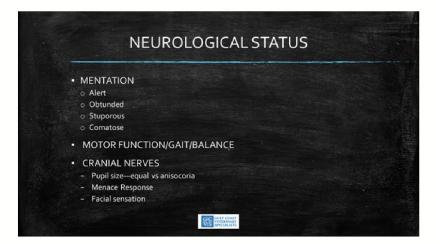
STAGES OF HYPOVOLEMIA (DOG) Mild (compensatory) Moderate Heart rate per min 130-150 150-170 170-220 Mucous membrane Normal to pinker than Normal to slightly pale Grey, muddy, white colour normal Capillary refill time Vigorous, <1s Reduced vigour, 1.5s >2s or absent Pulse height Short Pulse duration Mild decrease Severe decrease Moderate decrease Metatarsal pulse Easily palpable Just palpable Absent Plasma lactate 5-8 >8 concentration (mmol/l) **GUIDELINES ONLY

HYPOVOLEMIC SHOCK -- CATS Do not have same cardiovascular response as dogs Not as predictable signs of improvement with resuscitation Bradycardia Hypothermia Slowly warm feline patients AND restore volume

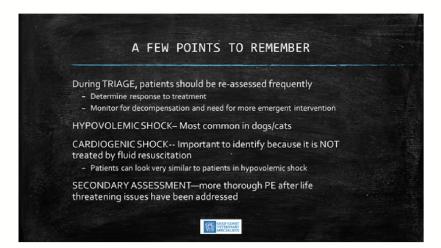
• Global hypoperfusion – most common pathological reason for increased lactate • In general: how severe the hypoperfusion but NOT if reversible or not • If not normalizing with fluids, start to think of other conditions - Under-resuscitation - Ongoing cause of hypoperfusion—fluid loss? - Increase not due to hypoperfusion—sepsis, SIRS? • Numerous studies on using lactate as prognostic indicators for sepsis, GDV













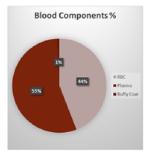
Blood Products & Transfusion Medicine for the Veterinary Technician

Alexia French, LVT

Objective's

- Blood Product Basics
- Blood Types (Canine & Feline)
- Pre-transfusion Lab work
 - Saline Agglutinations
 - Blood Typing
 - Crossmatching (major vs minor)
- Transfusion Reactions
- Transfusion Monitoring

Blood Products

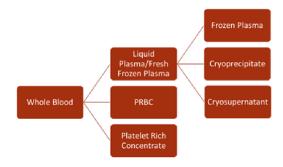








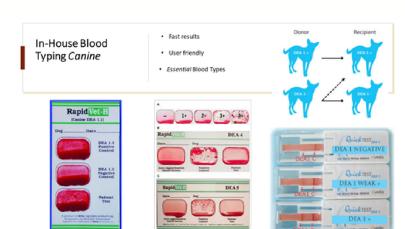
Blood Products Breakdown



Blood Type Breakdown

- 01	
Canine	Feline
DEA 1 (1.1, 1.2)** DEA 3 DEA 4 DEA 5 DEA 7 New Findings to consider: DAL Kai	A B AB New Findings to consider: Mik

DEA= Dog Erythrocyte Antigen



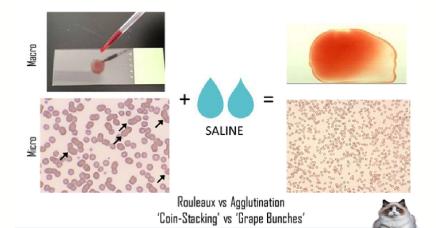


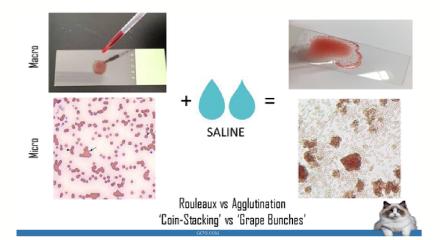
Saline Agglutination Testing

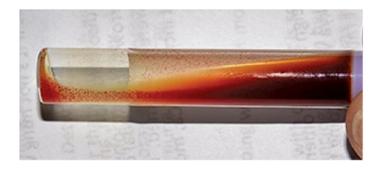
Procedure:

- 1. Place one small drop of your patients EDTA blood onto a slide via a pipette or HCT tube
- 2. Place a few drops of saline onto the same slide (1-2 dogs, 3-4 cats) (0.9% NaCl)
- 3. Mix the slide gently by rocking back and forth
- 4. Observe the slide MACRO & MICRO for agglutinationcoverslip optional

- Inexpensive
- Quick Results
 Not standardized











Crossmatching





- Urgency of need
- · Ease of Use
- · Compatibility accuracy



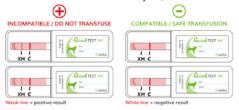




Source: https://www.rapidvet.com/xmatch_infhttps://www.abrint.net

Crossmatching - Alvedia XM LabTest/QuickTest



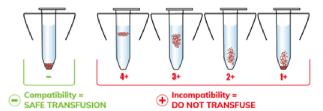


C = Control Line
XM = Antiglobulin Test for detection of Canine CrossMatch

The XM test line will often be weaker than the control line.

Manufacturer: ~25 minutes Me: ~35-45 minutes

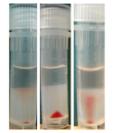
Crossmatching - Alvedia Gel Kit



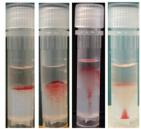
Manufacturer: ~25 minutes

Crossmatching









Positive

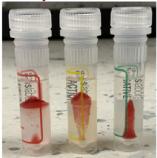
Manufacturer **Examples**

~20-30 minutes Me: ~12-15 minutes Potentially Objective



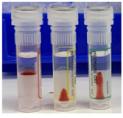


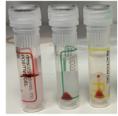


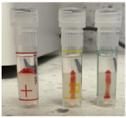


Crossmatching











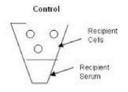




Crossmatching - Manually (Major & Minor)

Major Donor Cells 0 0 0 4 Recipient





Source's:

ABRI-Crossmatch PDF

~35-45 minutes 'Gold' standard Not standardized

Transfusion Reactions

Immunologic vs Non-Immunologic

r Reactions
-Transfusion Associated Dyspnea (TAD)
-Transfusion Associated Cardiac Overload (TACO)
-Transfusion Related Acute Lung Injury (TRALI)

Allergic Reactions

Acute Hemolytic Transfusion Reaction (AHTR)

Delayed Hemolytic Transfusion Reaction (DHTR)

Febrile Non-Hemolytic Transfusion Reactions (FNHTR) Delayed Serologic Transfusion Reaction (DSTR)

Transfusion Transmitted Infection (TTI)

Hypocalcemia/Citrate toxicity

Transfusion Related Hyperammonemia

Hypotensive Transfusion Reactions (HyTR)

Post-transfusion purpura (PTP)

Transfusion associated graft versus host disease (TA-GVHD)

Hernatology and Transfusion Medicine (AMTIM) Transfusion Reaction Small Animal Consensus Statement (TRACS), Part 1: Del Care (San Antonio), 2021 Mar;31(2):141-166. doi:10.1111/vec.13044. Egub 2021 Mar 31. PMID: 33792171.

Febrile Non-Hemolytic Transfusion Reactions (FNHTR)



- Most Common
- · Reaction to protein/substance in donor plasma
- · characterized by a temperature
 - > 39°C (102.5F) AND an increase in temperature of > 1°C (1.8F)
- from the pre-transfusion body temperature
 Mild & Self limiting typically

RULE OUT:

- -patient warming devices -Blood Product Handling
- -Underlying infection (DVM)

Acute Hemolytic Transfusion Reaction (AHTR)



- Due to presence of antibodies in recipient plasma against donor RBC antigens
- Intravascular hemolysis during or up to 24 hours of transfusion

Clinical Signs:

- -tachycardia
- -tachypnea
- -restlessness
- -fever
- -hemoglobinemia
- -hemoglobinuria

Allergic/Anaphylactic Transfusion Reaction



Reaction can range from mild to severe
 -can occur within minutes or hours
 -systemic or local
 -more sever signs will include respiratory system,
 gastrointestinal, skin, and circulatory.

Clinical Signs:

- -pruritus -urticaria -swelling
- Severe Signs:
 -signs of shock or anaphylaxis
 -vomiting
 - -hypotension
 - -respiratory distress

Non Immunologic Reactions

- · Circulatory Overload Reaction
- · Hypocalcemia/Citrate overload
- Sepsis

Rapid Transfusion Rate/large volume

- Prior disease
- · Improper handling/contamination
- RBC aging
- Improper storageImproper administration

Transfusion Monitoring

Recommended transfusion monitoring protocols and prevention measures to ensure a safe transfusion:

Initial set of vitals prior to transfusion

Continue to monitor vitals until the transfusion is finished q 5min for 15 minutes (3) q 15min for 30 (2)

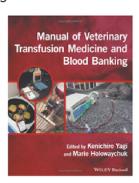
q hourly

Xenotransfusion / Autotransfusion....



Resources & Favorite Essentials

- https://www.vet.cornell.edu/animalhealth-diagnosticcenter/laboratories/comparativecoagulation/clinical-topics/transfusionguidelines
- TRACS 1, 2, and 3



Other Resources & Cited

- · https://www.abrint.net/frequently-asked-questions/
- https://www.dovelewis.org/sites/default/files/resource-files/DoveLewis_CanineBloodComps-Cryoprecipitate-Form_2018_All.pdf
- Davidow EB, Blois SL, Goy-Thollot I, Harris L, Humm K, Musulin S, Nash KJ, Odunayo A, Sharp CR, Spada E, Thomason J, Walton J, Wardrop KJ. Association of Veterinary Hematology and Transfusion Medicine (AVHTM) Transfusion Reaction Small Ainima Consensus Statement [TRACS]. Part 1: Definitions and clinical signs. J Vet Emerg Crit Care (San Antonio). 2021 Mar;31(2):141-166. doi: 10.1111/vec.13044. Epub 2021 Mar 31. PMID: 33792171.
- Davidow EB, Blois SL, Goy-Thollot I, Harris L, Humm K, Musulin S, Nash KJ, Odunayo A, Sharp CR, Spada E, Thomason J, Walton J, Wardrop KJ. Association of Veterinary Hematology and Transfusion Medicine (AVHTM) Transfusion Reaction Small Animal Consensus Statement (TRACS) Part 2: Prevention and monitoring. J Vet Emerg Crit Care (San Antonio). 2021 Mar;31(2):167-188. doi: 10.1111/vec.13045. Epub 2021 Mar 10. PMID: 33751789.
- Odunayo A, Nash KJ, Davidow EB, Blois SL, Goy-Thollot I, Harris L, Humm K, Musulin S, Sharp CR, Spada E, Thomason J, Walton J, Jane Wardrop K. Association of Veterinary Hematology and Transfusion Medicine (AVHTM) transfusion reaction small animal consensus statement (TRACS). Part 3: Diagnosis and treatment. J Vet Emerg Crit Care (San Antonio). 2021 Mar;31(2):189-203. doi: 10.1111/vet.3045. Epub 2021 Mar 10. PMID: 3375-1797.
- https://www.gribblesvets.co.nz/wp-content/uploads/2019/06/How-to-Saline-Agglutination-test.pdf
- https://europepmc.org/article/PMC/4907801
- https://www.dvm360.com/view/transfusion-medicine-proceedings-0

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Recognize – Understand – Act: 3 Key steps to managing compassion fatigue & building resiliency







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Compassion Fatigue: The cost of caring for others 66 What is to give light must endure burning. ZOETIS PETCARE

Recognize – Understand – Act: 3 Key steps to managing compassion fatigue & building resiliency







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Compassion Fatigue: The Cost of Caring for Others

J.Am Vet Med Assoc. 2015 Oct 15;247(8):945-55. doi: 10.2460/javma.247.8.945.

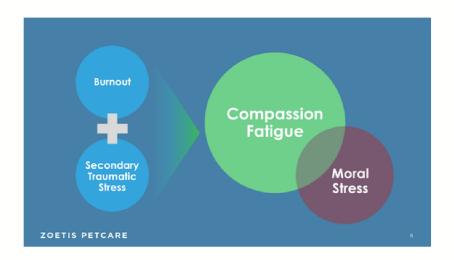
Risk factors for suicide, attitudes toward mental illness, and practice-related stressors among US veterinarians.

Nett RJ, Witte TK, Holzbauer SM, Elchos BL, Campagnolo ER, Musgrave KJ, Carter KK, Kurkjian KM, Vanicek CE, O'Leary DR, Pride KR, Eunk RH.

Abstract
OBJECTIVE: To evaluate the prevalence of suicide risk factors, attitudes toward mental illness, and practice-related stressors among US

9% have serious psychological distress 31% experienced depressive episodes 17% suicidal ideation

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Stressors that create poor wellness in veterinary teams

- Giving bad news
- ► Managing adverse events
- ▶ Euthanasia
- Interacting with difficult clients
- ▶ Working effectively in teams
- Balancing work and home
- Financialissues
- ► Moral stress

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#1 is handling ethical dilemmas/moral stress 57% experienced 1–2 per week, 35% 3–5 x/week

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Moral stress the top trigger in veterinarians' compassion fatigue

Veterinary social worker suggests redefining veterinarians' ethical responsibility

Veterinarians and Humane Endings: When Is It the Right Time to Euthanize a Companion Animal?

Oliver Knesi", Benjamin L. Hart', Aubrey H. Fine', Leslie Cooper', Emily Patterson-Kane^o', Kendull Elizabeth Houlihar' and Raymond Anthony

- ▶ Moral Stress is **not** a loss of compassion
 - You are prevented from acting on what you believe is the compassionate, caring thing to do. Example: Knowing that an animal should be euthanized, but the family is not willing
- Ethical Decision-Making Frameworks can help minimize distress as a result of routinely performing euthanasia

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15

Guilt

Shame

I need to apologize for something I've done

I need to apologize for who I am

I **made** a mistake

l **am** a mistake

What is the difference?

Healthy guilt allows us to seek forgiveness and correct a wrong. It can lead to healing.

Shame causes us to fear that we will be rejected so it tempts us to disconnect from others and avoid what causes us shame.

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Shame can make us **feel** like compassion fatigue is a **weakness**

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Recognize – Understand – Act: 3 Key steps to managing compassion fatigue & building resiliency





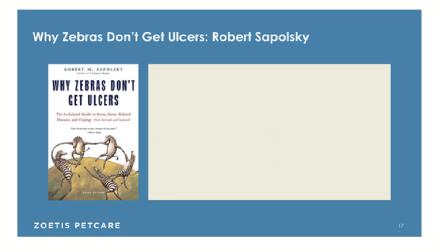


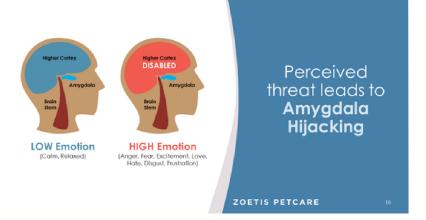
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14

Science behind Compassion Fatigue Central Nervous System Sympathetic (Gas Pedal) Protection and survival Stress response Adrenal (stress) glands activated "You can't be in growth and protection at the same time.39 Dr. Bruce Lipton





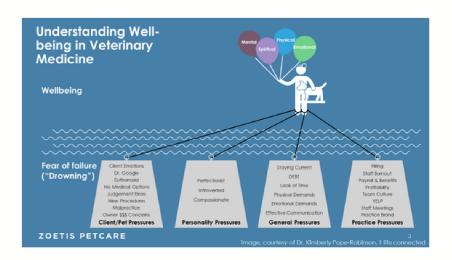


Recognize – Understand – Act: 3 Key steps to managing compassion fatigue & building resiliency















Central Nervous System



'arasympathetic Brake Pedal)

- ► Rest ► Digest ► Relax
- Growth & development

CF Antibodies: Self-relaxation

- ▶ Diaphraamatic Breathing
- ► Expand peripheral vision
- Relax your pelvic muscles

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CF Antibodies: Self-regulation /connection

- Being with a companion animal
- ▶ The Power of the Human Animal Bond

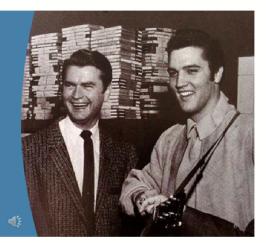


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CF Antibodies: Intentionality

Be true to yourself



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Physical self-care

- ► Taking care of your body
- Most basic aspects: nutrition, rest, exercise

What you do for physical self care?

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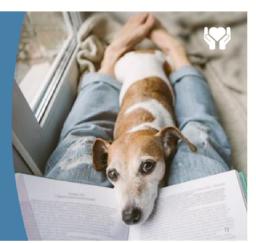


Emotional self-care

- Having emotions is good it means things matter to us
- Includes activities that help you acknowledge and express your feelings on a regular basis, happy, sad, or angry.

What you do for emotional self care?

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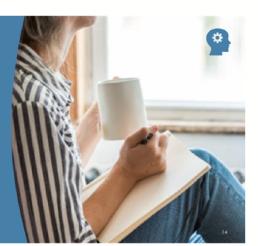


Mental self-care

- ► The things that you're filling your mind with greatly influence your psychological well-being
- ► Focusing your attention on the present moment
- Doing things that keep your mind sharp

What you do for mental self care?

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Spiritual self-care

- Nurturing your spirit (doesn't have to involve religion)
- Anything that helps you develop a deeper sense of meaning, understanding, or connection

What you do for spiritual self care?

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People typically don't try to work on these skills until they have suffered from the lack of them.

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Culture:

Sharing similar values, attitudes, beliefs and behaviors

- · Coworkers/Team
- Community
- Clients
- Camaraderie
- Patients
- · Your facility





WHAT DOES CULTURE MEAN TO YOU?

Core values – Not just the company's, think of your personal core values. What are your top 3?

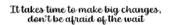


... and then what does it mean for your team and hospital



What is the current state of your team's culture?

- Survey each team member and evaluate their individual needs
- Evaluate yourself!!!
- Recognize and Reflect
- · Check in and consistency
- · Create an action plan
- Toxic? Burnt out?







Toxicity and Burn out

Toxic:

Exhibit actions that are detrimental to an organization's personnel, property, or vision

Burn out:

A syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed (W.H.O.)









Toxic:

- Absenteeism
- Bullying/harassing
- Taking credit or sabotaging for other's work
- Complaining without action
- Blaming others for their mistakes
- Competitiveness/Comparing

Burn out:

- Exhaustion
 - Mental, physical, emotional
- Cynicism
- Reduced or lack of accomplishment
- Detachment and avoidance



Look in the mirror!

Is it hard to put in the effort?

You feel drained and helpless?

Need to fix everyone and everything?

Unmotivated?

Always sarcastic?

Impatient with colleagues?

Is it always someone else's fault?





Repairable? Or Irreparable?

The Toxic Employee

If it's you:

- Be aware (think 1st, act 2nd)
- Remember your values
- Stop, listen, and be open to criticism Hold them accountable
- Let your ego go!
- Be accountable

If it's them:

- Foster an open environment
- Give direct and honest feedback
- Assign independent tasks
- Compromise



Repairable? Or Irreparable?

The Burnt-Out Employee

If it's you:

- Leave work at work
- Get help it's ok to ask!
- Prioritize
- Take time off!
- Meditate, practice mindfulness
- Get back to basics
- Practice self compassion

If it's them:

- Respect boundaries
- Avoid knee-jerk reactions
- Do something nice
- Be compassionate
- Offer and encourage EAP
- Be confidential
- Change up job duties



Once identified as toxic or burnt out, take action quickly!

Don't let things escalate; Don't ignore the issues Learn to recognize symptoms

Sometimes separation from the company is necessary And this is OK!

Toxic employees are difficult to turn around – be ok letting go

Boomerang Employee





Big Picture:

Cultivate Light at the end of the tunnel Climbing the Mountain Takes a Village and Balance





Resources:

- Mentorvet.net
- DVM360
- MayoClinic.Org
- Indeed.com
- Workhuman.com





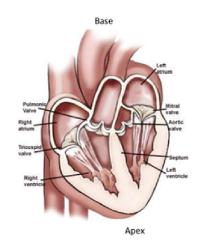
Cardiac Anatomy and the Interpretation of Common Electrical and Muscular Abnormalities

Catherine Huff, LVT, BAS

Cardiac Anatomy Review

Systole: tricuspid and mitral valves close: blood pumps out of the ventricles. (higher arterial pressure measured)

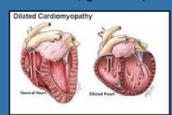
Diastole: tricuspid and mitral valves open and pump fills the ventricles (lower arterial pressure measured)

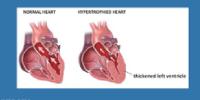


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Common Muscular Disorders

- Can be issues with musculature or valves
- · Right sided failure results in systemic edema
- Left sided failure results in pulmonary effusion
- · Most common valve disorder: Mitral or Bicuspid
- Common anatomical failures: heartworms, DCM, HCM, genetics (PDA)



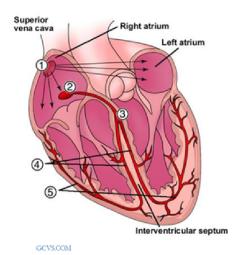


Electrical Conduction Review

- 1 Sinoatrial node (Pacemaker)
- 2 Atrioventricular node
- 3 Atrioventricular Bundle (Bundle of His) 4 Left & Right Bundle
- branches 5 Purkinje Fibers

Depolarize = contraction Repolarize = relaxation





Placing the leads

- Black and white on front limbs (B=Left/W=Right)
 -Placed at the elbow region
- Green and red on back limbs
- (G=Right/R=Left)
 - -Placed at the stifle region.

Ground the animal and use a conductive agent such as alcohol, paste or pads

Remember:

Red and green = xmas: end of the year: rear of the dog

White=right

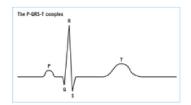
Smoke above fire: black above red





Reading the Electrocardiogram







Commonly Seen Artifacts

Muscle Tremor



Incorrect Lead Placement



leads I & III are mirror images

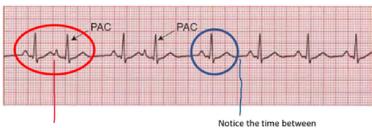
"far-field" signal

Wandering Baseline: Resistance between patient and electrode. Can be caused by resp movement





The atria contract before the ventricles have relaxed



There is no distinction between

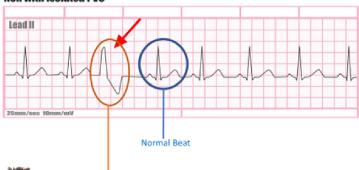
T and next P wave.

the normal T and next P wave



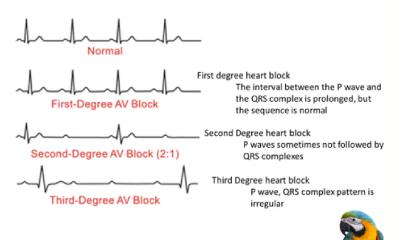
Premature Ventricular Contraction

NSR with isolated PVC NSR = normal sinus rhythm / PCV = premature ventricular contraction



No atrial contraction before ventricular contraction

Heart Block



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Questions??





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*Results from clinical studies conducted in the US and EU.1,9 NGF=nerve growth factor; NSAID=nonsteroidal anti-inflammatory drug.



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