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## New Equipment Will Advance Care

"Life is change. If you aren't growing and evolving, you're standing still, and the rest of the world is surging ahead."

— Louise Penny, *Still Life*.

**W**e are excited to say that equine ambulatory is growing on many fronts. When we originally opened our ambulatory doors, or perhaps, started our engines is a better way to say it, in 2001, I was a new graduate and intern, excited to delve into equine medicine. I felt as if I had been waiting my entire life for this moment. From my earliest memories, all I know is that I wanted to be a veterinarian and work with horses.

We started out with one faculty member, an intern, and one truck equipped with most of what is needed for a full-service ambulatory practice. Over the years, we have grown significantly, welcoming our third veterinarian to the practice this year. We are excited that Kelly Gravitt, DVM, who finished her American Board of Veterinary Practitioners residency, will be staying on. Between Martha Scharf, DVM, Dr. Gravitt and myself, we can run three trucks many days of the week, accommodating more clients. We



also have four rotating interns this year who each bring excitement and a special interest to our practice.

A few years ago, we added a Lameness Locator, an objective lameness evaluation system, to our ambulatory practice, and this tool has really been incredible not only for true lameness examinations but for purchase exams as well. This is one of those tools that makes a person wonder how we ever got along without it. Last fall we were fortunate to obtain a state-of-the-art field endoscope, after receiving a generous donation. This endoscopy system allows us to scope not only upper airways but includes a 3-meter scope for gastroscopy as well as an oral endoscope for dental proce-

dures. It has truly been an amazing addition and we are so grateful to expand our services.

We have just received word that after much hard work and deliberation, the veterinary hospital will be acquiring a standing computed tomography system. The system is a helical fan beam CT system developed specifically for use in horses. The design will allow us to scan the head, upper neck and lower limbs of standing horses. We will no longer have to put horses under general anesthesia to obtain CT images. This will revolutionize our practice. We will be one of only a small handful of practices in North America to have this piece of equipment.

Finally, with many of our equine faculty interested in building our simulation teaching center, we have a strong equine presence in the new lab. We know, that between having high-fidelity models to practice on and state-of-the-art equipment, we are turning out new equine veterinarians who are prepared, technically savvy and ready to hit the road!

**Sincerely,**  
**Alison LaCarrubba, DVM**  
**Diplomate, ABVP**  
**(Equine Practice)**

### Mission Statement:

The mission of our equine ambulatory service is to provide the highest standard of medical and surgical care to our patients while training the next generation of veterinarians.



# Meet the MU Equine Ambulatory Team

Alison LaCarrubba, DVM, DABVP

**A**lison LaCarrubba, originally from New York, grew up riding hunter-jumpers and dressage from a young age. After graduating from Cornell University with a degree in animal science, LaCarrubba moved to the Midwest to obtain her veterinary degree. She graduated from the University of Missouri College of Veterinary Medicine in 2001. LaCarrubba completed an internship in equine medicine and surgery at the university and subsequently spent a year working in an equine exclusive private practice. She returned to the university in July 2003 as a clinical instructor, and in 2009 she completed the specialty boards with the American Board of Veterinary Practitioners in Equine Practice.

LaCarrubba's love of equine dentistry has inspired her to continue her training in this area. In recent years she has attended a variety of advanced equine dental courses, which have allowed her to develop specialized skills and expertise in this field. As the equine dentist for the university, LaCarrubba is excited to see all things dental, from routine work to more complicated extractions. When she is not at work, she is spending time with her husband and three children. The whole family enjoys horses and riding together on Missouri's beautiful trails.

Martha Scharf, DVM, DABVP

**M**artha Scharf practices equine ambulatory medicine at the Equine Hospital. Scharf was born in Chicago and grew up riding hunter-jumpers in St. Louis. Since moving to Columbia, she has continued to ride and started to explore three-day eventing. After earning a DVM degree at MU, she completed a rotating equine internship at the university. Scharf has obtained certification in equine practice by the American Board of Veterinary Practitioners and completed chiropractic training for large and small animals. She continues to work as an assistant teaching professor for the Equine Ambulatory Service.

Scharf spends the majority of her time instructing senior veterinary students while providing quality medical care for horses within the Columbia area.



She is particularly interested in wound management and emergency care in the ambulatory setting. Scharf works closely with the referral clinicians in the Equine Hospital to provide superior care to horses.

Kelly Gravitt, DVM

**K**elly Gravitt, grew up in Waterloo, Illinois, a farming community just outside of St. Louis. She started riding horses when she was young, primarily showing in the jumper ring. After completing her DVM degree at the University of Missouri in 2019, she spent a year as a rotating intern through the Equine Medicine, Surgery, and Ambulatory services. Gravitt recently finished her equine ambulatory residency and has stayed for an additional year as a postdoctoral fellow while working toward an ABVP certification in equine practice. In her free time, she enjoys spending time with her husband and two Australian shepherds, cooking, and being with friends and family.

**O**ur interns have a special interest in working with horses and potentially going on to complete a residency specializing in either equine medicine or equine surgery. Every June we welcome a new crop of interns. This year our interns include Megan Gallaher, Brianna Hamrick, Gabrielle Gonzalez and Alexandra Warren, who is completing a specialty internship.

Megan Gallagher, DVM

**M**egan Gallagher grew up outside of Raleigh, North Carolina, in a town called Fuquay-Varina. She learned to ride saddle-seat at a young age and competed through high school. Gallagher received her bachelor's degree in animal science from North Carolina State. She then returned to NC State to complete her doctorate in veterinary medicine with an equine focus. Following graduation in 2021, she completed a one-year rotating equine internship at Blue Ridge Equine Clinic in Earlysville, Virginia. The great experiences at this internship solidified her passion for equine surgery, and she wishes to pursue a surgical residency. In her free time, she enjoys spending time with her rescue horse, Legacy, taking a drive in her Mustang, or getting ice cream with her awesome fellow interns



Continued on page 3

Team, continued from page 2

Gabrielle Gonzalez, DVM

**G**abrielle Gonzalez was born and raised in Puerto Rico. At the age of 17, she moved to Miami to complete a bachelor's degree in biology at Florida International University. She then attended Tuskegee University College of Veterinary Medicine and earned her veterinary degree in 2021. She completed an equine rotating internship at Arizona Equine Medical and Surgical Centre shortly after graduation. Gonzalez enjoys all aspects of equine veterinary medicine, but has a special interest in internal medicine, reproduction, neonatology and preventive medicine.

She has been riding horses since a young age in both Western and English disciplines. She was a competitive show jumper for 10 years and was able to represent her country in an international competition with her horse, Majestic. In her spare time, she loves spending time with family and friends, traveling, swimming in the ocean, and spending time with her two dogs and cat. When she gets a chance to visit her island home, she enjoys riding her two mares, Anita and Gemma

Brianna Hamrick, DVM

**B**rianna Hamrick is from Lancaster, South Carolina. Her Alexandralove of horses started young, riding hunter/jumpers for most of her life. She completed her undergraduate degree at the University of Georgia, then attended Iowa State University's College of Veterinary Medicine where she earned her DVM in 2021.



Following graduation, Hamrick moved to Lexington, Kentucky, for a hospital internship at Rood and Riddle Equine Hospital. She hopes to eventually complete a large animal surgery residency, and her interests include equine sports medicine, working with performance horses, lameness, and soft tissue surgery.

Outside of work, she enjoys spending time with her great Dane, Tate, trying out new coffee shops, and caring for her many plants.

Alexandra Warren, DVM

**A**lexandra Warren is originally from Calgary, Canada, but spent most of her childhood living overseas. She grew up riding horses, primarily English show jumpers. Warren returned to Canada in 2014 to begin her university studies. She graduated with her doctorate of veterinary medicine from the Western College of Veterinary Medicine, University of Saskatchewan, in June 2020. Following graduation, she completed a one-year equine surgical internship at Hagyard Equine Medical Institute in Lexington, Kentucky. She then completed a equine rotating internship at Mizzou and has stayed on to do a surgery and emergency specialty internship.

Warren plans to pursue an equine surgery residency. In her free time, she enjoys being outdoors, cooking and reading.



## Standing CT Means Safer Diagnostics

Alison LaCarrubba, DVM, DABVP (Equine Practice)

**C**omputed tomography (CT) has revolutionized the equine industry and equine practice over the past 20 years. A CT scan is a diagnostic imaging tool that uses X-ray images taken from a variety of angles combined with computer processing to create cross sectional images of bones, soft tissue, and other internal structures of the body. During a CT scan, the X-ray beam moves in a circular ring around the area of interest taking images close together allowing for greater detail than a typical radiograph. The newest software then converts them to three-dimensional images, which can be immensely helpful when planning surgical procedures or better understanding the problem at hand.

At the MU Veterinary Health Center we have a CT scanner that can be used on small animals and horses only under general anesthesia. General anesthesia comes at higher expense and increased risk to the horse. We have recently learned that we will installing a standing CT for horses, and we could not be more excited! The helical fan beam CT system was developed specifically for use in horses. The design will allow us to scan the head, upper neck and lower limbs of standing horses.

It has a sliding gantry that can tilt from 0° to 90° for either horizontal or vertical scanning. Along with the head and upper neck, the system can scan from the hoof

Continued on page 4



# Supplement Use Demands Caution

Martha Scharf, DVM, DABVP (Equine Practice)

The equine supplement industry is an almost \$100 million industry and is growing rapidly every year. There are products available online, at local stores, and through your friends in the horse community, each promising to provide a healthier horse through gut health, joint support, healthy coats, stronger hooves, or many other mechanisms.

While some of these products can dramatically improve the life of your horse, it is also important to know that equine supplements are not regulated by any governing body and may not have the effects or even contain the ingredients they claim. Some supplement ingredients have been shown to be effective and are widely recommended by veterinarians, but others have less research to support their benefits (or have even been shown to be harmful). It can be overwhelming to sort through the information and decide how best to protect your horse and your budget.

Equine joint supplements are potentially the most popular and most numerous of all the available products. But just like the others, all joint supplements are not created equal. In fact, a shocking few stand up to label claims for contents, efficacy or bioavailability. For these reasons, choosing the right supplement to help your horse stay athletic

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**Standing CT, continued from page 3**

up the limb to include the carpus/tarsus (knee/hock) and can scan both limbs simultaneously, saving time and money, at the same time improving safety to the horse.

CT images have revolutionized both human and veterinary medicine, greatly improving our ability to diagnose and then accurately treat a variety of medical conditions. Lameness is one of the most common problems veterinarians deal with in equine medicine. Many lamenesses can be complex and difficult to diagnose. Having extremely detailed images of bone structure is critical to obtaining an accurate diagnosis and moving forward with a treatment plan tailored to the problem.

	Glucosamine	Chondroitin	ASU (Avocado/soybean unsaponifiable)	Cetyl myristoleate	HA (Hyaluronic acid)	Omega 3 Fatty Acids	MSM (methyl sulfonfyl methane)	Devil's Claw
Recommended Dose	5.4-18 g/day	1.6-6 g/day	1-6 g/day	5-7.5 g/day	20-300 mg/day	7.5-19 g/day	9-10 g/day	2.8-5 g/day
Proven clinical effects:								
Supports cartilage production	✓	✓	✓					
Slows cartilage breakdown		✓	✓			✓		
Inhibits inflammatory mediators	✓	✓	✓		✓	✓	X	
Improvements in lameness					✓	✓		X
Prevents joint swelling				✓				
Well absorbed	✓	X	✓	X	✓	✓	✓	✓
Other	Work better in combination							Do not combine with other meds
Vet recommended?	✓	✓	✓	Neutral	Neutral	Neutral	X	X

can be overwhelming but the guidelines in the chart can help you think through finding the right products.

Before starting a supplement regimen, ask your veterinarian for their specific recommendations for your horse. They can help advise you with their knowledge of your horse and the research behind many of the ingredients. There may also be other medications they recommend that can benefit the horse more than a supplement.

Beyond that, there is some information you can gain from the product itself. A recognizable company name and manufacturer information should lead you to established and sustainable companies that you can contact for educational material and customer support. Additionally, most of the well-known companies have a traceable history of research

for the safety and efficacy of their products. The label claims should not include unrealistic promises to cure your horse or prevent common ailments. And it is important to remember that a few testimonials without data or citations of research are less likely to be associated with a quality product.

The contents should be clearly noted on the label along with their expiration dates. Additionally, administration recommendations should be clear and precise, typically varying with the size or needs of the horse. Finally, even the safe, verified ingredients have variable research and efficacy. The chart can help guide you on what joint supplements products are most likely to be worth implementing. As with any supplement, please contact your veterinarian for recommendations for your specific horse.

The skull, sinus system and dentition of the horse is quite complex and difficult to image with radiographs alone. CT allows us to create three-dimensional images of the complex sinus systems, or diagnoses skull fractures and dental disease with much greater accuracy and sensitivity.

Although CT itself is not a new technology, the ability to perform the CT in the standing horse will allow us to use this technology in a safe and affordable way. By removing the need for general anesthesia, we decrease risk to the horse during the procedure, while obtaining images that can aid and direct our treatment plans.

# Using Models and Simulation to Advance Veterinary Education

Alison LaCarrubba, DVM, DABVP (Equine Practice)

As we continue to grow and develop as a veterinary college, we are always looking for innovative ways to improve our teaching to develop the most skilled, productive and prepared students to become the next generation of veterinarians and leaders in the industry. The human medical field has been using simulations and models for their students for decades. This tool is now becoming more common in veterinary education.

So, what exactly is a simulation? Veterinary simulations can either be lifelike models used to practice procedures or experiences in which the students engage in practice sessions with actors pretending to be veterinary clients. The goal of simulations is to build technical skills as well as develop the communication skills require to be successful in practice. Veterinary simulation models allow veterinary students to gain knowledgeable experience without risk or stress associated with working on live animals. Techniques, such as learning a variety of suture patterns, can be learned on “skin” made from silicone or other materials.

As we continue to develop our simulation center here in the MU College of Veterinary Medicine, there are so many incredible tools we can now use. Our current simulation center has a full-sized horse, with capabilities for practicing rectal palpation, with a lifelike gastrointestinal tract and reproductive tract. We can manipulate the GI tract and have the students determine the exact “cause of the colic.”

At the same time, the students can practice reproductive examination, palpating both the uterus and ovaries, which come with a variety of



follicle sizes. Along with this, the horse has jugular veins to practice venipuncture and catheter placement and a small area on ventral midline to practice abdominocentesis, or acquisition of fluid from around the intestines, a procedure commonly performed during a colic work up.

We recently were awarded a grant and have purchased a second high-fidelity model of a horse head that allows practice of passing a nasogastric tube, endoscopy of the upper airways and guttural pouches, venipuncture, flushing of the nasolacrimal ducts and even enucleation, or removal of an eye, fully equipped with a system which will result in bleeding during surgery. These models are truly amazing and teach everyone valuable lessons, from our first-year students to our interns and residents.

Along with these models we also have a “farrier buddy” for students to practice everything from picking up and holding a hoof, to cleaning it and placing and removing a shoe.

Next February the college plans to send a cohort of faculty who are in-



timately involved in promoting simulations in veterinary medicine to the International Veterinary Simulation Teaching Conference on the island of Grenada.

This conference hosts a group of international veterinary educators who are dedicated to promoting and advancing the use of simulation in veterinary education. The conference is an excellent resource regarding creative experiences for students and we are more than excited to bring home a lot of valuable information with respect to integrating this technology into our veterinary education.



# Bacteria Versus the Equine Joint

Alexandra Warren, DVM

**A**ny time a horse is three-legged lame one of our top differential diagnoses is a septic joint. Septic joints occur when bacteria are introduced into the joint through a wound. The wound can be a tiny puncture wound that is not easily noticed. Joint injections are another potential cause for joint infection, though with proper sterile technique this risk is low. Horses with an infected joint are markedly lame, the joint is hot, swollen and painful to the touch. A definitive diagnosis is made by collecting a sample of joint fluid to analyze for the presence of bacteria, but a presumptive diagnosis can be made based on wound location or pressurising the joint with sterile fluid and visualising the fluid exiting the wound. In foals suffering from septicemia, multiple joints can become infected as bacteria in the blood move into the joint. Rapid treatment of septic joints helps to ensure a better outcome.

The solution to pollution is dilution. Flushing the bacteria from the joint is the number one way to beat infection. This can be done in a few different ways. The gold standard is to lay the horse down under general anesthesia and perform an arthroscopy. An arthroscopy is where a camera (the arthroscope) is placed into the joint through a small incision allowing the surgeon to look around the joint to allow for assessment of the damage and extent of infection. A second portal can be made to insert an instrument to remove pannus (vascular fibrous tissue that can harbour bacteria) and at the end of the procedure a large cannula is inserted to allow for a large volume lavage of the joint. The second-best treatment option is also performed under general anaesthesia, but instead of using the arthroscope to lavage the joint, large bore needles are used to move fluid through the joint and flush out the bacteria. Without the use of the arthroscope pannus cannot be easily removed and could plug the needles making flushing difficult to do in large volumes. The longer one waits to treat a septic joint, the more pannus and fibrin builds up making needle flushing more difficult. The needle lavage can also be done in the standing horse, but when a horse is only under standing sedation smaller volumes of fluid must be used as joint distention is painful which makes it less effective. Sometimes, repeated flushing is recommended in more severe cases.

Antibiotics are also hallmark therapy. Intravenous antibiotics are frequently recommended for the first few days of treatment before switching to an oral antibiotic. These require referral to a hospital to allow for catheter placement and management. The reason for using intravenous antibiotics is that one can achieve better broad-spectrum coverage for different types of bacteria than with oral options (there are very few oral antibiotics available for horses). When a horse is initially



diagnosed with a septic joint, the offending bacteria is unknown until a culture is obtained, which takes several days. So, using antibiotics that are effective against more types of bacteria is better. Once a culture is obtained, the antibiotics may be altered to better target the bacteria present in the joint. Antibiotics can also be injected directly into the joint to provide higher concentrations of antibiotics at the site of infection.

Anti-inflammatories like phenylbutazone and banamine are often used as well to help reduce inflammation and help keep the horse comfortable during treatment. Bandaging the affected limb is also helpful to provide support, reduce swelling or to help manage the associated wound. If a wound is present, the wound is often allowed to continue to drain and may not be closed or may be left partially open. This is because it will allow the wound to drain out any infected material, but the bandage will prevent further contamination. The wound therapy will depend on the individual wound. Once infection has fully cleared, joint injections with hyaluronic acid or steroids may be recommended to promote joint health and reduce any remaining inflammation.

The earlier the joint is treated the better the prognosis. The longer the infection is allowed to fester the more damage to the internal structures. The infection can spread into the bone and damage the cartilage leading to osteoarthritis, which can require long-term treatment. In severe cases, the damage to the joint can be so severe euthanasia is necessary. Even horses that are treated immediately can have negative consequences that require life-long management. So, if your horse suddenly goes lame or has a wound that looks close to a joint have your vet examine your animal to make sure no bacteria have invaded a joint.

# Lameness Exams in the Field Can Require Some Detective Work

Brianna Hamrick, DVM

**W**hether your horse had an acute injury, or it has been a chronic problem, lameness is a common issue encountered by horse owners. Lameness is a symptom, often due to pain, rather than a diagnosis. There are several tools available for ambulatory veterinarians to evaluate lameness without the horse having to leave your property.

Since a horse cannot tell us what happened while they were out in the pasture or where exactly it hurts, veterinarians have some detective work to do. To start, a history is helpful to point in the right direction. You know your horse best, and hearing your perspective is important. Your veterinarian will then perform a physical exam, looking specifically for focal swelling or heat, limb edema, joint effusion, and evaluating the digital pulses.

Next, a subjective lameness exam is performed. This includes watching the horse walk and trot in a straight line and circling both directions, ideally done on flat footing. Using asymmetry in the horse's movement, the lameness can be narrowed down to either a forelimb or a hindlimb. Forelimb lameness is often associated with a "head bob" when the affected limb is weight-bearing, while hindlimb lameness can manifest as a difference in hip movement between the right and left legs. The lameness might be observed consistently, or it may only be apparent under certain circumstances. A tool called the Lameness Locator, which uses sensors placed on the horse to objectively evaluate and quantify asymmetric movement, may be used in conjunction with the veterinarian's exam as well.

So far, the exam has identified which limb is primarily affected and under what circumstances. This is only



part of it! Each limb is composed of multiple bones, soft tissues, and joints that could be the source of your horse's pain. Increased digital pulses and hoof testers can be used to evaluate sensitivity in the foot. The veterinarian can also perform flexions by holding each limb in a way that stresses joints in the lower and upper limb. Based on the horse's response to these manipulations, a local anesthetic will then be placed either under the skin over specific nerves or directly into a joint. This takes 10 to 15 minutes to desensitize, or block, the area. The horse is then trotted again to determine if no change, some improvement, or sound.

There is the potential that several blocks may need to be subsequently performed to localize the lameness to a joint or region. It can be a time-consuming endeavor, but localization will determine one specific area

to then perform diagnostic imaging. The imaging modalities utilized are radiography to evaluate the orthopedic structures, and ultrasound for soft tissue such as muscle, tendons and ligaments.

Your veterinarian will combine all the information gained from the physical exam, history, lameness evaluation, and diagnostic imaging to come to a diagnosis. Even for a presumptive diagnosis, a plan for treatment or rest and rehabilitation can be formulated. While the goal is that your horse will respond positively to treatment, it is possible that follow up or recheck will be necessary in a couple of weeks to months.

Lastly, if further evaluation is warranted or advanced imaging is needed, our hospital's surgery service offers MRI, CT, and nuclear scintigraphy (bone scan).



# Management of Laminitis Requires Dedication and a Team Approach

Kelly Gravitt, DVM

**L**aminitis, commonly referred to as founder, is a condition of which many horse owners are aware. The disease results from a disruption of blood flow to the laminae within the foot that secure the coffin bone to the hoof wall. The sensitive and insensitive laminae of the foot act in a Velcro capacity and create a bond between the hoof wall and the bone. When the blood flow is disturbed, the resulting inflammation weakens this connection and, in severe cases, causes separation leading to rotation or displacement of the bone. An owner who has a thorough understanding of the causes and signs of laminitis will be able to recognize the disease and implement quick treatment for the horse.

There are a variety of inciting causes that can lead a horse to have laminitis: digestive upsets due to a grain overload or abrupt change in diet, toxins released within the horse's system, high fever or illness that can cause serious metabolic disturbances (Potomac horse fever, salmonella, etc.), severe colic, retained placenta in a mare after foaling, excessive concussion to the feet, or even excessive weight bearing on one leg due to injury to another leg. Horses with equine metabolic syndrome or pars pituitary intermedia dysfunction (PPID or Cushing's) are at an increased risk of developing laminitis, especially when they are allowed sudden access to excessive amounts of lush forage or grass. Horses that are most at risk for developing laminitis tend to be overweight, fed large amounts of carbohydrate-rich meals, or have had previous episodes of laminitis.

Laminitis may appear suddenly (acute) or be a chronic issue in the horse. Horses with acute laminitis typically show signs of lameness, especially when turning in circles, and may shift weight between legs frequently when standing. Heat in the feet, increased digital pulses, and a reluctant or hesitant gait (as if walking on eggshells) may also be noted in cases of acute laminitis. A horse with chronic laminitis may have rings in the hoof wall that become wider when followed from toe to heel, bruised soles, a widened white line, and a thick, "cresty" neck.

Treatment is best when implemented quickly. Some mainstays of treatment include allowing the horse to stand in deep supportive bedding to act as a natural cushion for the feet, administering medication for inflammation and pain, and applying cold water or ice to the feet to reduce inflammation. It is also important to identify the underlying primary problem, such as a



metabolic or inflammatory disorder, since laminitis is often due to a systemic or general problem elsewhere in the body.

Management of laminitis is a dedicated process that can either lead to useful careers and lives or can be deemed unsuccessful if the disease cannot be controlled. When a horse has had laminitis, it is likely to reoccur again. Therefore, certain management practices can be implemented to improve prognosis of the horse. A diet focused on high-quality forage, digestible fiber and oil is preferred to one high in carbohydrates, such as grain. It is also important to find a farrier who can help with routine trimming and therapeutic shoeing. Avoiding lush pastures is especially important. Plant sugars are highest between late morning and late afternoon hours and after sudden changes in temperature. Therefore, it is best to restrict pasture time for at-risk horses during the spring or when the pasture suddenly becomes green.

Laminitis can be a difficult disease process to control and often necessitates a team effort between the owner, farrier and veterinarian. If you have any questions about the disease, please feel free to call the MU VHC Equine Hospital.

# A Midsummer Night's Nightmare: Potomac Horse Fever

Megan Gallagher, DVM

**P**otomac Horse Fever is a disease that comes to mind whenever a horse becomes acutely ill in the mid-to-late summer months. As a potentially fatal disease for our equine friends, it is imperative for all horse owners to be aware of this disease and to know when to seek medical attention.

## History and Lifecycle

Potomac Horse Fever (PHF) is most commonly caused by a bacterial species named *Neorickettsia risticii*. The organism was discovered by Dr. Miodrag Ristic in 1985, shortly after an outbreak of PHF occurred along the Potomac River in Maryland. Since then, cases of PHF have been identified throughout most of the United States and even in other countries. Many cases are reported in Missouri every year. Due to the lifecycle of the organism, the vast majority of PHF cases are found along major waterways.

The *Neorickettsia risticii* bacteria live within the many life stages of a parasitic flatworm called a fluke. An infected bat will contaminate the environment with fluke eggs. Freshwater snails are then infected by the developing fluke. Once the fluke reaches the larval stage, they are released into the environment once again only to infect many species of growing aquatic insects. These insects include mayflies, dragonflies, stoneflies, caddis flies, and damselflies. The adult flies, still infected with the fluke larva, are then consumed by bats. The larvae develop into mature flukes within the bats and the life cycle repeats.

## So how does this impact horses?

If left alone, the life cycle of the flukes infected with *N. risticii* will continue without impacting other species. Problems arise for horses when they unknowingly consume the flies infected with flukes. Infected flies have the potential to die on

grass or within water that the horses graze or drink. These flies can travel miles from bodies of water, so even horses that do not have free access to ponds, rivers, or streams can become infected. It is also important to note that horses can only acquire PHF by consuming the infected insects. PHF is not contagious between horses.

## Clinical Symptoms

Once infected, horses exhibit many nonspecific symptoms such as a moderate to high fever, anorexia, lethargy, and colic-like behaviors. Pregnant mares may abort their foals. Because the bacteria infect the cells of the small and large colon, colitis (inflammation of the colon) develops. Colitis leads to more than 50 percent of horses developing diarrhea. If the diarrhea becomes severe enough, horses can become dangerously dehydrated. Horses with PHF are also more likely to develop laminitis secondary to the disease, which can be a fatal consequence even if the dehydration and inflammation is corrected.

The most common findings on blood work include an increased hematocrit due to dehydration, severe leukopenia characterized by a neutropenia as white blood cells are sequestered to the colon, and hypoproteinemia (low protein) due to protein loss in the inflamed, leaky gut. A thrombocytopenia, or low platelet count, is also seen in PHF cases.

## Diagnosis and Treatment

Your veterinarian can collect feces and a blood serum sample to submit for PCR testing to detect the presence of *N. risticii*. Knowing the prevalence of disease in your geographical location and the time of year is often used in early diagnosis. Treatment of choice for PHF is oxytetracycline, an antibiotic that is given once to twice daily for three to five days. NSAIDs, such as flunixin

meglumine, are given to control fever and inflammation. Severe cases with profuse diarrhea and dehydration require hospitalization to be placed on continuous IV fluids. Ice boots are used to prevent laminitis. Horses with colitis will often require a low bulk diet such as a senior grain to allow the colon to rest before slowly refeeding with a grass hay. The key to a good outcome is catching the disease early and starting treatment right away.

## Prevention

As veterinarians like to say, the best course of treatment for any disease is prevention. PHF is a difficult disease to prevent when living in an endemic region. However, aside from moving to a region that does not have reported PHF cases, there are many management steps that can be taken to help protect your beloved equine companions.

There is a PHF vaccine available that the American Association of Equine Practitioners recommends administering once to twice a year for at-risk horses. This vaccine is unfortunately not 100 percent efficacious as it only targets one of the many strains of PHF. Just this year, a new organism, *N. findlayensis*, was discovered as a possible causative agent of PHF. With this discovery comes the need for further research and development of a better vaccine. For now, horses that are vaccinated for PHF are reported to have better coverage when vaccinated twice yearly, three to four months apart. The first vaccine should be given in late March, followed by another vaccine in late June-early July before the onset of the PHF season.

Farm management is crucial to prevent disease. Horses in endemic regions should not be allowed access to bodies of water. Pastures that

Continued on page 11



# Older Teeth Need Special Care

Gabrielle Gonzalez, DVM

Equine medicine and nutrition have improved throughout the years. Thanks to these advancements, many horses are living into well into their 30s and beyond the point of normal dentition. They are outliving their teeth. This has made the importance of a healthy oral cavity environment and geriatric dentistry more prevalent and more important than ever.

Horses are classified as geriatric when they reach 18 to 20 years old. Termed hypsodont, horse teeth are constantly erupting from the gingiva throughout their life and get worn by their constant grazing and chewing. As time progresses, the amount of reserve crown (the portion of tooth that has not yet erupted) decreases and eventually the geriatric horse runs out of tooth reserve. However, there is variation in this process and worn-out teeth may first appear in horses as young as 16 years old or in horses as old as 25.

A common presenting complaint for a geriatric horse is weight loss. Although weight loss can be a result of other diseases in an older horse, like PPID or neoplasia, there is a high incidence of dental disease that accompanies weight loss in an older horse. As horse owners, it is important to watch for changes in the way your horse eats. Signs of dental problems other than weight loss can include eating more slowly or unwillingly, moving food around the mouth more than usual, holding the head sideways while eating, quidding (dropping partially chewed food out of the mouth), and bad odor from the mouth or purulent nasal discharge. Another less apparent sign that there could be a teeth problem is mild diarrhea or fluid in normal manure. When horses are not chewing their hay completely, the long fibered stem can cause some irritation to the intestines. All these signs warrant not only an oral examination from your

vet, but a complete physical examination with appropriate laboratory tests if indicated.

The occurrence of periodontal disease and gingivitis increases as horses age. When it goes untreated, periodontal disease can cause tooth loss and the destruction of alveolar bone. If a horse loses a tooth, the opposing tooth has nothing to wear against. When the opposing tooth catches in the space where the absent tooth used to be, it can cause the horses jaw to lock up and prevent the horse from chewing in a circular motion. This affects the way the horse eats by causing pain in the temporomandibular joint (TMJ), which allows the horse to open and close its mouth. It is important to manage the tall tooth that results from an opposing lost tooth by dental equilibration with a power or hand float by your veterinarian.

Loss of teeth may also result in a step or wave mouth in the geriatric horse. It is termed a step or wave mouth due to the row of teeth resembling a staircase or a wave. The cheek teeth have a combination of tall and short teeth in one arcade. This occurrence can be treated with dental equilibration of the tall teeth with a power or hand float to make the horse more comfortable and improve its ability to chew. Difficulty chewing can lead to bigger problems such as choke or impaction colic.

Infection is another common problem seen in geriatric horses. Loose teeth, periodontal pockets (expanded spaces between teeth), or tooth fractures may all lead to tooth root or sinus infection. Old horses with compromised immune systems that suffer from PPID, for example, are more prone to infections. To prevent and treat these possible problems, frequent and proper dental care is required. In most cases, antibiotics or extraction of the infected tooth can help clear the infection and provide relief.

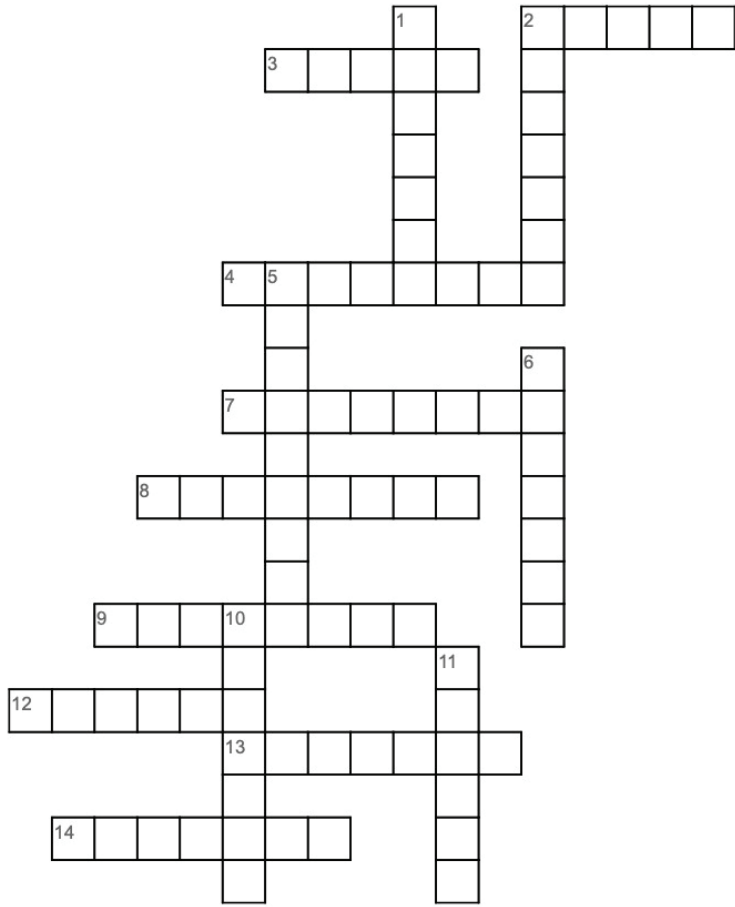
Like younger horses, older horses also develop sharp points and hooks, although with less frequency. These can lead to ulcers in the cheek or tongue that become uncomfortable.

Older horses are prone to having food pack between their teeth due to periodontal pockets or diastema, which is space between teeth. While cleaning out the pockets, your veterinarian might find a loose tooth as the root of the problem. Removing this tooth would be a solution, followed by periodic reduction of the opposing tooth so it does not become tall. Also, flushing your horse's mouth periodically may help clear the food packed between the teeth. On scheduled dental exams, your veterinarian will clean up the periodontal pockets and may put impression material over it to prevent packing and allow it to heal.

Your horse's incisors may sometimes develop problems if they are fractured, loose, or develop resorptive lesions. A condition that causes tooth resorption of the incisors and sometimes the canines is termed equine odontoclastic tooth resorption and hypercementosis or EO-TRH. This disorder affects older horses, and it has a gradual onset that can go undiagnosed. Some things you might notice that can be indicative of EOTRH are loose or crooked incisors or your horse might lose interest in biting a carrot or special treat. This disease is extremely painful for horses and since a cause has not been found, prevention is unknown. On the other hand, with early detection and radiographic confirmation of resorption, it can be treated by extraction of the incisors by your vet. Horses with no incisors do well without them and will often go back to grazing normally using their lips and be much happier without the pain. This disease is progressive and might necessitate the extraction of all incisors.

Continued on page 12

# Horse-lovers Crossword



Across

- 2 Pattern of paint horse where the white does not cross the back
- 3 A scratch found on the cornea of an eye
- 4 Unit for measuring weight in veterinary medicine
- 7 The lower jaw
- 8 Difficult birth typically caused by poor positioning of the fetus
- 9 Common skin tumor of grey horses
- 12 Common term for Equine Asthma
- 13 Test used to check for Equine Infectious anemia
- 14 Tooth at the front of a horse's mouth

Down

- 1 Castrated male horse
- 2 Marsupial that carries EPM
- 5 Cause of colic that is common with dehydrated horses
- 6 Fatal disease characterized by a 'sawhorse stance' and muscle spasms
- 10 Walled-off lesion of pus that can cause acute lameness in the horse
- 11 Sire of a mule

Answer key is on page 12.

PHF, continued from page 9

are often flooded should also be avoided. Horses should have access to fresh water that is dumped and cleaned daily to remove any insects. Special care should also be taken when designing barn and yard lighting. Lights over water troughs

can attract insects that die and fall into the water. Cases have been reported where a stalled horse, with no access to outside water sources, contracted PHF simply because their stall water bucket was the closest to the lights in the barn.

While Potomac Horse Fever can be a nightmare for horse owners, by understanding the symptoms, knowing when to call your veterinarian, and practicing prevention, we can keep our equine companions safe and enjoy the summer spent with them.

### Teeth, continued from page 10

Dental modifications may be a small part of the overall care of geriatric horses. A proper nutrition is a large part of keeping an older horse healthy when its ability to grind feed is reduced or absent. A high-quality protein and high-energy density complete senior feed may be needed as well as soaked hay or beet pulp to replace a bale of hay. Frequent oral rinsing with water or dilute chlorhexidine solution to control periodontal disease and release feed packed in periodontal pockets is a good management strategy to add to the routine of your older horse care. Frequent dental examinations by your vet to check for any disease or problem can help prevent a more serious issue in the future.

## Crossword Solution

