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Updates Create Service Improvements

Alison LaCarrubba, DVM, DABVP

In order to stay current, the Veterinary Health Center (VHC) is continually updating equipment and creating new opportunities for veterinarians and clients. If you have visited the VHC recently, you will have noticed that the parking lot for the Equine and Food Animal hospitals is under construction. We are fortunate to be the beneficiaries of a new building to house our ambulatory vehicles as well as classroom and office space. This building is exciting for those of us who scrape ice from windshields during the coldest winter months!

This year the equine section is also fortunate to have been able to update our digital radiograph units, both in the clinic and in the field. I have never been so in love with a piece of equipment. Our ambulatory unit is completely wireless. This is especially exciting to those of us working in the field. We can now bring the radiograph unit to a horse in almost any location and take films. Having no cords connecting the equipment also increases safety as well as efficiency. To top it off, the images are truly of the highest quality.

Many of you may be familiar with the Lameness Locator, a wireless, objective lameness evaluation system created by Kevin Keegan, DVM, one of our surgeons. Keegan is never idle and he has recently been working on a wireless system to help detect mild neurologic deficits in horses. It is not uncommon to have a horse present for lameness that actually has low-grade neurological deficits. These mild deficits can be difficult to detect. This new system has so much potential to help us reach a more accurate diagnosis quickly. We look forward to seeing progress on this new technology.



Construction taking place in the Equine and Food Animal hospitals parking area is for an ambulatory facility that will house food animal and equine ambulatory vehicles as well provide office space and a seminar room.

Fall, with its cool weather and beautiful foliage, is my favorite time of year for riding. Now that my children are old enough to ride with me, I find myself looking forward to our weekend excursions. I hope that you all are able to saddle up and enjoy your time with your equine friends.

We would like to thank all of you for your continued support of our program. Please don't hesitate to call or contact us if you have any questions or need help with anything.

If you haven't already, please like us on Facebook so you can keep up with the current equine news, patient updates and other fun facts: www.facebook.com/MUEquineClinic/

Meet the MU Equine Ambulatory Team

Alison LaCarrubba, DVM, DABVP

Alison 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 has 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

Martha Scharf practices equine ambulatory medicine at the Equine Hospital. Scharf was born in Chicago and grew up riding hunters/jumpers in St. Louis. Since moving to Columbia she has continued to ride and started to explore three-day eventing. After earning a DVM at MU, she completed a rotating equine internship at the university. She continues to work as a clinical instructor 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.

Dee Whelchel, DVM, DACVIM-LA

Dee Whelchel works with both the Equine Internal Medicine and Ambulatory services. Whelchel is originally from Atlanta, where she grew up riding hunter/jumpers. She attended Emory University for undergraduate studies and completed a master's degree in physiology at the University of Georgia with a research focus on botulinum neurotoxin. She completed her DVM at the University of Georgia, followed by a one-year internship in large animal medicine and surgery at Texas A&M University. Whelchel then returned to UGA to complete a residency in large animal internal medicine in 2011. During her residency, she researched low molecular weight heparin therapy in horses.



Whelchel spent three years in private practice in South Carolina where she worked both as an ambulatory clinician and a boarded equine internal medicine specialist. Her experience included time in Aiken, South Carolina, which is a unique multidiscipline equestrian community that includes three-day eventing, hunter/jumpers, thoroughbred training centers, and Fédération Équestre Internationale-level driving. Her professional interests include equine infectious diseases, endocrine disorders, respiratory disease, critical care, cardiology and neonatology. In her free time, she enjoys riding horses, biking and hiking.

Our 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 Katie Bucy and Jessica Millwood.

Katie Bucy, DVM

Katie Bucy grew up in Westminster, Maryland. She competed in eventing and was part of the local pony club, 4H and FFA programs. She attended Virginia Tech for her undergraduate studies and graduated in 2006 with a bachelor's degree in biochemistry. Bucy then moved to North Carolina and worked as a veterinary technician for a few years prior to attending Ross University School of Veterinary Medicine.

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Potentially Serious, Choke is Manageable

Martha Scharf, DVM

Choke, also known as esophageal obstruction, is a common condition of horses that occurs when the esophagus (the flexible, muscular tube from the mouth to the stomach) becomes blocked. Unlike choke in humans, which refers to blockage of the airway, horses are typically able to breathe while choked. However, with time, their airway may become compromised by regurgitated food and saliva. As a result, emergency veterinary care should be sought immediately upon discovery of a choke to prevent significant complications.

The most common cause of choke is a mass of swallowed food that is served in pieces that are too large, improperly chewed, too coarse, too dry, or that swell after swallowing. Esophageal obstruction has also been reported with foreign objects, such as shavings, riding crops, wood and

Although uncommon, long-term, unnoticed obstructions can progress to esophageal rupture, shock, severe infection and death.

corn cobs. The mass becomes caught in the esophagus, partially or completely obstructing the passage of more food.

Horses can be predisposed to choke by rapid eating, dental disease, inability to swallow normally (caused by neck injuries, neurological disease, or scars or masses in the esophagus), or access to excessively coarse feeds, such as straw or dry beet pulp. Choke can affect horses of all ages, but it is commonly diagnosed in geriatric horses due to poor dentition, neurological abnormalities or both.

Choke is most often discovered following a feeding when saliva and feed

material is observed coming from the nostrils and mouth. Although the horse may initially try to eat or drink, these attempts generally exacerbate the drainage and lead to coughing. Often, the horse is anxious, repeatedly attempting to swallow, gagging, and coughing.

If the obstructing object is large and in the neck portion of the esophagus, it may be palpable as a firm, painful mass on the left side of the neck. Following the initial period of acute distress, many horses become calmer but will continue retching and maintain a downward extension of their neck and throat. With time, dehydration and depression will occur. Although uncommon, long-term, unnoticed obstructions can progress to esophageal rupture, shock, severe infection and death.

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Bucy's clinical year was completed at RUSVM's affiliate school, Oklahoma State Center of Veterinary Health Sciences, where she gained experience working with the western riding disciplines. She graduated in 2015 and completed a yearlong internship at New England Equine Practice in Patterson, New York. During this internship she gained experience working with horses trained in the hunter/jumper, eventing and dressage disciplines.

Her professional interests include surgery and lameness evaluations, and she hopes to pursue a surgical residency after the completion of her internship at Mizzou.

In her free time, she enjoys hiking, reading and completing various crafts.



Jessi Millwood, BMVS, MRCVS

Jessi Millwood grew up on a hobby farm in Ruthersfordton, North Carolina. She attended the University of North Carolina at Wilmington for undergraduate studies in marine biology and Spanish. She is a 2015 graduate of the University of Glasgow School of Veterinary Medicine. She went on to complete a one-year internship in large animal internal medicine at the University of Saskatchewan.

Millwood's clinical interests include ambulatory and internal medicine. She is interested in pursuing a residency in internal medicine and a professional career in academia, or returning to a mixed animal private practice.

In her free time, she enjoys traveling and spending time with family, friends and her dog, Acacia.



Esophageal obstructions can often be treated successfully by a veterinarian. Sedatives and muscle relaxants are administered to relax the muscle of the esophagus and lower the head to prevent inhalation of food and saliva into the lungs. In mild cases, this alone may allow the passage of the blockage into the stomach. Passage of a stomach tube can confirm that the obstruction has been relieved. In more severe cases, water through the stomach tube can be used to lubricate the blockage and gently push the obstruction toward the stomach.

In some cases, this can be a long, slow process to wash the obstruction out without damaging the esophagus. Endoscopy (a video camera into the esophagus) can be used to evaluate the blockage and the health of the esophageal mucosa. Severe occurrences may also require anesthesia to relax the horse completely or surgery to relieve the blockage. Rarely, cases may not be resolved despite all efforts.

After resolution of the blockage, most horses require rehydration with fluids and electrolytes. For days afterward, the esophagus is often painful, requiring the administration of anti-inflammatory medications and feeding of wet mashes of pelleted feed and grass. Many horses are also treated with antibiotics to prevent pneumonia that may result from inhaled food and saliva.

Following recovery, horses should also be examined for any predisposing factors such as dental disease, abnormal swallowing, resulting esophageal scars or other abnormalities, or food bolting behaviors.

While choke can be a serious problem, proper management can markedly reduce the risk of long-term complications, and early detection and treatment can typically resolve the problem without further complication.



A filly that had inflammation of the intestines, is now in good health, thanks to the quick response of the owner, who contacted the MU Veterinary Health Center for assistance.

Sick Filly Saved Due to Alert Owner, Team Care

Case Study

Alison LaCarrubba, DVM, DABVP

The Equine Ambulatory Service was called to evaluate a neonatal quarter horse filly on a mid-March afternoon. The filly had been born at approximately 4 a.m. that day. The filly would not suckle for more than a few seconds at a time. The owner bottle-fed colostrum to the filly, and it was noted that the filly passed meconium earlier in the day.

Upon examination by the Ambulatory Service, the filly was quieter than expected, but showed some vigor. The physical examination parameters were within normal. Shortly after the examination, the filly was seen tail flagging and straining to defecate, so

an enema was given and a fair bit of fecal material was passed. The filly was given mare's milk via nasogastric tube since she was not nursing well, and an antibiotic was initiated. A few hours later, the filly was lethargic, reluctant to stand and not nursing well. It was decided that referral to the VHC was the safest option to save the foal.

On presentation at the VHC, the filly was showing signs of colic, lying down and rolling onto her back. She was in good body condition and weighed 95 pounds. Her heart and respiratory rates were increased, but rectal temperature was normal. Her

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Case Study, continued from page 4

heart and lungs auscultated normally. Normal gastrointestinal sounds were present in all four abdominal quadrants. Her feet were cool to the touch and pulse quality was weak. The abdomen was mildly distended.

Foals that show signs of distress and lethargy can decompensate quickly. We placed an intravenous catheter and obtained blood to evaluate the foal's health status. A complete blood count revealed a severely decreased white blood cell count showing significant compromise as well as mild dehydration. Transabdominal ultrasound showed a moderate amount of fluid in the abdomen and thickened small intestinal walls. A fluid sample was obtained from the abdomen and it showed significant abnormalities.

Based on the initial evaluation, the filly was diagnosed with presumptive sepsis and peritonitis secondary to enterocolitis, or inflammation of the intestines as well as the area around the intestines.

Initial therapy consisted of plasma to boost the immunity of the foal by providing antibodies, intravenous fluids for rehydration and cardiovascular support, broad spectrum antimicrobial therapy and a gastro protectant. Within the first 48 hours of treatment, the filly showed significant improvement and was consistently suckling the mare without assistance or need for supplemental nutrition.

This case illustrates that it takes a team to quickly and correctly diagnose a sick foal and provide the necessary intensive care to give the foal the best chance at life. This filly's story ended on a positive note due to the fast action of the owner noticing that there was a problem, as well as referral to the VHC, which was able to provide around-the-clock care with a team approach. The filly was discharged within a week and went on to thrive, with no complications or untoward effects.

What Horse Owners Should Know About Neonatal Sepsis

Dorothy Whelchel, DVM, DACVIM-LA

Any horse owner who plans to breed mares and raise foals should know about neonatal sepsis. Neonatal sepsis is a significant cause of mortality and morbidity in foals of less than seven days of age. Early recognition can be life saving. By definition, sepsis is an identified or suspected infection along with a systemic inflammatory response syndrome, which may lead to organ dysfunction and shock. In neonatal foals, localized bacterial infection of the umbilical structures, joints and lungs, and diarrhea are especially associated with sepsis. In many respects, the clinical syndrome caused by sepsis is largely due to the foal's immune response to infection, resulting in a massive release of inflammatory and anti-inflammatory mediators that may further alter the function of the immune system, the microvasculature, blood coagulation and the endocrine system, eventually progressing to multiple organ failure and death.

Our understanding of sepsis continues to evolve in both human and neonatal foal medicine; however, risk factors for equine neonatal sepsis have been identified and warrant the awareness of the horse owner.

Historical risk factors include health problems of the mare or management issues during pregnancy, problems during delivery of the foal and abnormalities in the foal's behavior shortly after birth. Maternal illness during gestation, twin pregnancies, fescue exposure in the last 60 days of gestation, placentitis (often evidenced by premature udder development, fever and vulvar discharge) and premature lactation may predispose the neonatal foal to sepsis or other life-threatening complications including

dummy foal syndrome. Prematurity of the foal (birth at less than 330 days of gestation), prolonged delivery or dystocia (longer than 30 minutes delivery), red bag delivery, meconium aspiration during delivery, as well as prolonged time to stand and suckle after birth, are all considered risk factors for neonatal sepsis.

Owners should take note if foaling events follow the "1, 2, 3 Rule," which means that the foal should be standing within one hour of birth, suckle WELL within two hours of birth, and the mare should pass her placenta by three hours after delivery. If ANY of these events do not occur within the expected time, owners should call a veterinarian.

Close monitoring of a foal's behavior and nursing is important as the foal acquires passive immunity from ingestion of the mare's colostrum in the first six to 12 hours of life. If the foal does not get adequate intake of colostrum and absorption of maternal antibody, the risk for infection and illness significantly increases for the foal. In fact, decreased nursing, increased periods of lying down, and partial or failure of passive transfer are three of the most important risk factors of neonatal sepsis.

A diagnosis of neonatal sepsis is made based on physical examination findings, evidence of an infection based on the foal's white blood cell count, identification of localized infection, and blood cultures to detect bacteria within the blood. Physical examination findings suggestive of sepsis include abnormal mentation; signs of cardiovascular shock; evidence of infection such as swollen joints, heat or swelling of the umbilicus, evidence of

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respiratory disease such as pneumonia or the presence of diarrhea; and petechial hemorrhages along mucosal surfaces of the gums, eyes, nose or vulva of the foal. Fever (body temperature greater than 102.5 F) may be present, while some foals with neonatal sepsis may even have a low body temperature (less than 99 F).

If any evidence of sepsis is noted, prompt and appropriate broad-spectrum antibiotic therapy is essential. Delayed administration of antibiotic treatment can have a significant, negative impact on survival.

Additional therapies include administration of intravenous fluids and plasma. Ill foals may require extensive supportive care if they are not able to stand on their own, and foals suffering from septic shock may require aggressive cardiovascular support. The level of care required for these foals often warrants referral to an equine hospital capable of 24-hour care with board-certified specialists in equine internal medicine or critical care.

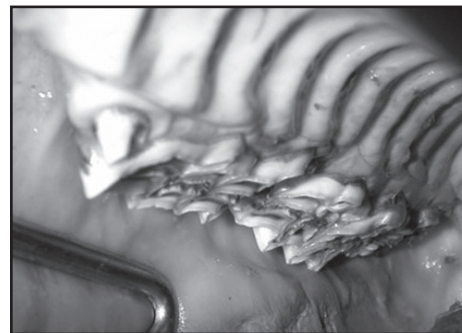
When sepsis is not recognized early or treated appropriately, the prognosis for survival is poor. Fortunately, during the past few years, prompt detection, early antibiotic therapy and advances in equine neonatal medicine have improved the prognosis for foals with sepsis. However, even in the face of aggressive care, many foals still succumb to the disease.

One of the most effective preventative measures horse owners can take against neonatal sepsis is to have a veterinarian perform a new foal examination between 18 and 24 hours of age, even if the foal is apparently healthy. At this time, the veterinarian will perform a thorough physical examination of both the foal and mare, examine the mare's placenta, which has been saved by the owner, and take blood to measure the foal's IgG concentration. This blood test ensures

passive transfer has occurred, and if the foal's IgG concentration measures low, the veterinarian will likely recommend administration of equine plasma to increase the foal's immunity. If the veterinarian finds any concerns, they may recommend additional testing, antibiotic treatment or referral to an equine hospital.

Take home points

- Good husbandry of broodmares may reduce the risk of neonatal sepsis and illness. Talk to your veterinarian about appropriate vaccination and deworming protocols as well as nutrition for the pregnant mare. After breeding, have a veterinarian perform an ultrasound examination to confirm pregnancy and check for twin pregnancies at day 14 post known breeding or ovulation dates. Avoid exposure to fescue grass or hay in the last 60 days of gestation as this may cause problems with delivery, placentitis and milk production.
- Notify your veterinarian promptly if you note any signs of maternal illness during gestation including fever, vulvar discharge or premature udder development.
- Know the "1, 2, 3 Rule" and call your veterinarian if these steps do not occur on schedule.
- Schedule a new foal examination with your veterinarian even if your foal appears normal. Have a veterinarian check your foal's IgG levels during this visit to confirm passive transfer. This can be accomplished with a stall-side kit called a Snap® Foal IgG Test.
- If your foal shows signs of decreased nursing, increased recumbency, weakness, abnormal behavior or signs of infection, such as diarrhea, swollen umbilicus or swollen joints/lameness, call your veterinarian immediately.



Wolf Tooth Removal is Best Done in Young Horses

Alison LaCarrubba, DVM, DABVP

The wolf tooth is the lay term used to describe the first premolar in the horse. It is typically a small tooth, located most commonly just in front of the first upper cheek teeth. The wolf tooth is what we call a vestigial tooth, or a remnant from the past, has no real function, and is not used in chewing.

Horses can have wolf teeth on the lower arcade as well, but this is unusual. The number, size and exact location of wolf teeth varies from horse to horse. Approximately 40 to 80 percent of horses actually have wolf teeth and these teeth typically erupt by 6 to 18 months of age.

Uncommonly, wolf teeth do not erupt properly and remain just below the surface of the gum. This is what we call blind wolf teeth and these unerupted teeth likely cause the most problems with biting and overall discomfort.

Whether to remove wolf teeth has become a somewhat controversial topic. The horse world is full of tradition, and removing wolf teeth in young horses is part of that tradition.

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There is no reason not to remove these vestigial teeth prior to starting a young horse in training. This can eliminate the potential for irritation and head shaking by a young horse in training. These teeth are best removed prior to 3 years of age, as they can become well-rooted with age, increasing the likelihood of fracturing the tooth when removing it.

Although the bit will never reach far enough back in the mouth to touch the wolf teeth, the soft tissues of the mouth, lips and gingiva can be pulled into a sharp wolf tooth causing irritation and pain. Also, it can be difficult to create an optimal bit seat on the first cheek teeth with the wolf tooth in the way.

Unerupted, or blind wolf teeth cause the most problems. These teeth tend to be displaced forward in the mouth and sit in a more horizontal plane, rather than vertical. These unerupted teeth may actually make contact with the bit and can be associated with pain. Sharp or displaced wolf teeth can cause pain and even ulcerations when the pressure of the bit is applied.

To remove wolf teeth, the horse is sedated, a speculum placed, and a local block used to desensitize the teeth being removed. The gingiva around each tooth is gently elevated on all sides, being careful not to apply too much pressure, which can cause the root tip to fracture.

Horses tolerate this procedure well and can be ridden in the same week as the removal. If there is any question of whether or not a wolf tooth is causing a problem, it is not difficult to eliminate that as a potential issue.

The extraction of wolf teeth is common, typically uncomplicated, and will allow horses to get back to the business of riding without distraction.



Treatment Options Are Varied for Cellulitis

Katherine Bucy, DVM

Cellulitis is severe inflammation of the subcutaneous tissues, which are the tissues located just below the skin. The cause of the cellulitis often is unknown, but may be related to bruising from trauma and subsequent bacterial infection. Some common causes of cellulitis are pastern dermatitis, also known as "scratches" or "mud fever," wounds, parasitism, and blunt trauma. Cellulitis usually begins as a slight swelling of the affected limb. If the condition goes untreated, it can progress until the area becomes hot and painful to the touch, and lameness develops — sometimes significant lameness. The skin over the affected area may begin to weep fluid, and the horse may develop a fever. If your horse is showing any of these signs, immediate attention is recommended.

The diagnosis of cellulitis is typically based on history and clinical findings of heat, pain, swelling, fever and possibly an associated wound. If there is

a focal area of infection, this can be cultured, but the diffuse nature of the disease often makes culture difficult.

Once a horse has developed cellulitis, the likelihood of a future recurrence increases. It seems that the lymphatics can be damaged, leading horses to recurrent bouts of painful cellulitis. Treatment will vary with the severity of disease, but supportive care will include the following:

- Hydrotherapy: cold hosing the swollen limb for 15 to 20 minutes twice per day. After hosing, dry the limb as much as possible. An antibacterial shampoo may be helpful during the first cold hosing session. Some examples are povidone iodine shampoo and chlorhexidine shampoo.
- Wrapping or sweating the limb: Wrapping the limb in a standing or stack wrap may significantly reduce swelling in the limb through compression.

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Equine Simulators: The Wave of the Future in Veterinary Medicine

Alison LaCarrubba, DVM, DABVP

Veterinary simulation models are becoming the wave of the future in veterinary colleges. These models possess characteristics that mimic the textures and feel of live animals.

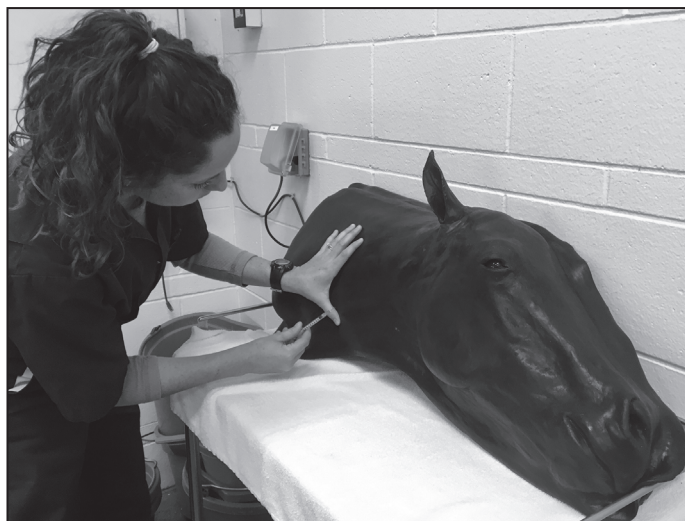
Simulated models or simulators allow veterinary students to build confidence and fine motor skills before caring for live animals. The models bridge the gap between what students learn in the classroom and what they need to be able to do in the clinic setting.

Working with simulators is an excellent first step to building confident and capable veterinarians.

There are a variety of simulators that allow students to practice suture skills, injections, nerve blocks, reproductive tract palpation and other minimally invasive procedures. The models are becoming so lifelike, there is now a full-sized horse colic simulator. The horse is modeled after a 15-hand quarter horse and allows students to practice rectal palpation with a complete gastrointestinal tract, along with other common procedures, such as venipuncture, intramuscular injections, and abdominal taps — procedures that are all commonly performed during a routine colic examination.

This past year we were fortunate enough to acquire a lifelike horse head that allows the students to practice intravenous injection, intramuscular injections, dental blocks, and nasolacrimal duct flush. We also have a model of a horse limb and hoof that allows students to practice taking shoes on and off and use common tools, such as hoof testers and hoof knives. The students are able to develop techniques and practice skills in a safe, low-pressure setting.

During the past couple of years, clinicians at the VHC have been using the simulation lab designed for the MU School of Medicine to practice client communications in an environment that allows for feedback and constructive evaluations. The students are presented with a scenario in which an actor posing as a client brings an animal to them and they have to perform an examination while answering the client's questions and generally handling the client



Simulators allow students to develop clinical skills before working with animals.

communications. This sort of simulation is proven to boost confidence in our students prior to actual client interactions.

We are excited about the prospects that the different variety of simulators offer, whether models or client interactions. We are hopeful that the VHC will be able to acquire the life-size colic simulator, which will allow our students to begin working on the skills needed to be a successful equine practitioner early in their careers.

If anybody would like to help the Equine Service acquire a simulator or support our other work, please contact our Office of Advancement at 888-850-2357.

Cellulitis, continued from page 7

- Hand-walking: Walking is beneficial in cellulitis cases to improve blood flow to the area and decrease swelling.

In addition to supportive care, broad spectrum antimicrobial therapy is typically required to control infection, along with anti-inflammatories to control pain and swelling.

To prevent cellulitis, follow these suggestions, and never hesitate to call with any questions:

- Examine all limbs and thoroughly clean any wounds as soon as possible.
- Avoid frequent bathing of the legs as this can dry out the skin and cause small cracks in the skin barrier.

- Contact a veterinarian if any swelling does not resolve within 24 hours from when it is first noticed, or if you have any concerns about the welfare of your horse.

As a general rule, the earlier a treatment protocol is started, the more quickly the horse will return to optimal health.

Intestinal Parasite Control Demands Tailored Approach for Mature Horses

Jessica Millwood, BVMS, MRCVS

Unfortunately, there is no one-size-fits-all program for intestinal parasite control, therefore, each farm or stable (with veterinary guidance) should develop its own program tailored to the specific needs of the farm or stable and each animal.

In general, all horses should be on a basic foundation of anthelmintic treatments, which consists of one or two yearly treatments to target large strongyles, tapeworms, bots and nematodes (*Habronema spp* and *Dracontia spp.* responsible for causing summer sores). Further deworming treatments should target horses with high strongyle contamination potential and should focus on control of cyathostomins at a time when mucosal burden is at its peak, such as toward the end of grazing season.

Goals of a parasite control program

1. Minimize the risk of parasitic disease
2. Control parasite egg shedding
3. Maintain efficacious drugs and avoid further development of anthelmintic resistance

To achieve these goals, knowledge of the magnitude of egg shedding of individual horses must be acquired. This knowledge can be gained by performing periodic fecal egg count surveillance.

Many factors affect the worm load of a horse:

- Age — Foals and young horses are more susceptible to certain parasites; immune status of horses changes over time.
- Location — Some parasites may be more common in certain areas or climates.



- Season — Parasite activity may be limited or peak during certain temperatures or seasons.
- Travel — Travel can be stressful and may decrease immune status at a time when there is an increased exposure to parasites by other infected horses.
- Pasture Load — Shedding of parasites by grazing horses will increase pasture exposure and pasture burden, which may lead to increased number of parasites that can infect your horse.

Identifying routine deworming requirements

Horses that graze together generally share the same parasite population; however, there are huge differences in their levels of strongyle egg shedding. Generally, within any group of mature horses (older than 3 years), 80 percent of the parasite egg burden is shed by only 20 to 30 percent of the adult horses in that group.

Performing a fecal egg count (FEC) within the optimal temperatures for cyathostome shedding (45 to 85 F), and after the effects of the last dewormer administered are completely gone, will allow your veterinarian to examine your horse's feces for the presence of worm eggs, to identify and count those eggs, and to categorize your horse into the appropriate level of shedder group to allow for the most targeted deworming strategy for your individual horse.

If you do not wait a suitable period of time following deworming treatment, the FEC will only reflect the efficacy of the last dewormer used instead of measuring the ability of your horse's immune system's ability to regulate cyathostomin egg shedding. To evaluate the egg shedding status in mature horses, a fecal sample should be collected a minimum of four weeks beyond the egg reappear-

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ance period for the last drug used. Currently recommended thresholds are based largely on the opinions of a majority of equine parasitologists, and as such, could change as more data are collected and analyzed.

Egg shedding categories for most horses remain consistent; however, some horses may switch categories, especially those with FECs near cut-off values. In general, it is advised to classify adult horses to the three strongyle contaminative groups based on more than one egg count performed at one time. Repeat FECs should be performed every six to 12 months. Assuming the horse stays within the same classification, current recommendations include three FECs every six months before reducing to every one to two years.

Below are the guidelines used for classifying horses on the basis of strongyle egg contamination potential and deworming recommendations until the next fecal egg count:

Fecal Egg Count Results and Recommendations

- Low Shedder — fewer than 200 eggs per gram feces: deworm twice yearly (approximately every six months)
- Moderate Shedder — 200 to 500 eggs per gram feces: deworm four times yearly (approximately every three months)
- Heavy Shedder — more than 500 eggs per gram feces: deworm six times yearly (approximately every two months)
- Horses with fecal egg counts greater than 200 eggs per gram feces should be dewormed at the time of testing.
- All horses should be dewormed at least twice yearly as follows:
 - Spring: ivermectin or moxidectin
 - Fall: ivermectin plus praziquantel or moxidectin plus



praziquantel

- Fecal egg counts can also be repeated more frequently throughout the year at intervals based on the last dewormer used:
 - Four to five weeks after fenbendazole (Panacur, Safe-Guard)
 - Four to five weeks after pyrantel (Strongid)
 - Six to eight weeks after ivermectin (Ivercare, Zimectrin)
 - 10-12 weeks after moxidectin (Quest)
- Fecal egg count reduction test
 - The efficacy of the dewormers used (against strongyles and/or ascarids) on each farm should be evaluated at least every three years using the fecal egg count reduction test (FECRT) to help determine if there is resistance to these products.
 - It is recommended to include at least six horses in a FECRT on each farm, always recruit the horses with the highest possible pre-treatment egg count for the FECRT, do not deworm horses within the last eight weeks prior to FECRT, and interpret results with care.

■ To perform the FECRT, a fecal sample is collected prior to deworming. The anthelmintic is administered and a fecal sample is collected 14 days post-treatment. The number of eggs in the pre-treatment and post-treatment fecal samples are used to calculate the percent reduction in FEC for each horse individually. The mean reduction for all horses tested is then calculated to determine the percentage reduction at the farm or stable. This value is then used to make inferences regarding the presence or absence of drug resistance.

Recommendations for fecal sampling, storage

Samples should be:

- normal feces — diarrhea samples can be tested qualitatively but cannot be used for FEC;
- manure that is as fresh as possible, ideally less than 12 hours old;
- refrigerated as soon as possible, but NEVER frozen;
- stored in airtight and leak-proof containers or plastic bags; and
- tested within seven days of collection.

Horses Susceptible to Skin Issues from Mild to Life-Threatening

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The skin is the body's largest organ. The skin serves many important functions yet it is often overlooked or underappreciated. Skin serves as a barrier to the environment, plays a critical role in thermoregulation and is pivotal in supporting a healthy immune system. Skin problems can range from annoying dermatitis to life-threatening tumors or congenital conditions and everything in between. Many horse owners can appreciate the myriad problems that affect their horse's skin.

Dermatitis literally means inflammation of the dermis, or skin. We tend to have many dermatitis cases during the wet times of the year. Certain horses are predisposed to dermatitis of the distal limbs, which often affects the sensitive white-haired or pink-skinned areas of the limbs the most. There are many names for dermatitis of the lower limb, such as "scratches," "mud fever," and "dew poisoning." Basically, when exposed to a wet environment for a long period of time, bacteria and fungal organisms colonize these sensitive areas creating heat, pain and swelling. Affected areas must be cleaned with anti-bacterial soap, treated with anti-bacterial and anti-fungal ointments, and most importantly, kept clean and dry to prevent further infection.

Less commonly, these infections need to be addressed with additional systemic antimicrobial therapy. Along the same lines, horses frequently exposed to rain or immunocompromised, can develop fungal dermatitis over their back. They develop the stereotypical crusting lesions associated with a well-known fungus called *Dermatophylus congolense*. The treatment



for this problem includes topical antiseptic soaks using products such as betadine or chlorohexadine, along with removing these horses from wet environments. Good-quality grooming will help to remove the dead skin and scabs and hasten the recovery period. Be sure not to share brushes and combs between horses with dermatitis to reduce spread.

Other issues that affect the skin can be associated with insect hypersensitivity and parasitism. This can be a real problem for sensitive horses during the spring and summer months. Some horses will develop significant skin reactions and nodule formation to tick bites. Other horses will have hypersensitivity reactions to fly bites, even to the point of developing hives. When this is associated with the biting midge, we use the term "sweet itch."

Fly sheets can be helpful, and leaving the horses in stalls with a fan during the times of greatest exposure can also be helpful. Certain parasites, such as *Habronema*, cause skin le-

sions that appear to be non-healing wounds, most often noted the limbs, lips and third eyelid of the horse. This condition is also termed "summer sores" and is self-limiting in that it resolves during the winter months. If recognized, it should be treated with appropriate deworming, and possibly adjunct topical anti-inflammatory therapy.

Horses can also develop more serious problems associated with the skin, such as tumors, including squamous cell carcinoma, sarcoids and melanoma. Squamous cell carcinoma is a type of skin cancer associated with ultraviolet radiation, most commonly affecting horses in areas of light or pink (unpigmented) skin. We most often find these tumors around the eyes, face and genitalia. The best way to protect against squamous cell carcinoma is to avoid direct sunlight during the summer months, and when there is snow on the ground, use an ultraviolet protection fly mask and sun block, turn horses out at

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night and keep them stalled during the day.

Sarcoids are the most common skin tumors of horses, accounting for one-third of all tumors reported. Sarcoids are locally invasive and may be associated with an area of previous trauma. They are also associated with a virus that affects cattle, so exposure to cattle or living in a field once inhabited by cattle can be a predisposing factor as well. There is no sex or breed predilection, but young horses are at increased risk. This type of tumor has a predilection for the head, eyelids and limbs, although they can certainly be found at any location on the horse.

Although sarcoids do not metastasize, these tumors are locally invasive, difficult to fully excise and typically require multiple follow-up treatments to achieve full resolution.



Aging gray horses are at a significant risk of developing melanomas. Up to 80 percent of gray horses older than 15 develop melanomas.

The common locations for melanomas to develop are in the perineal region (around the anus/vulva) and under the tail head, although they can develop in other locations. Di-

agnosis is typically based on clinical signs in a gray horse and we often refrain from treatment unless a tumor is growing significantly, ulcerated or in a problematic area, such as the eyelid. There are a few options to try and induce tumor regression, but at this point there is no gold-standard treatment. We are hoping this will change during the next few years as there is some promising research in this area.

This article offers a brief overview of some common skin problems, but it is not comprehensive. There are, of course, less common skin conditions associated with immune-mediated disease, other less common types of cancer and hypersensitivity issues.

If your horse develops a skin lesion and you are unsure of the next step, please call us at 573-882-3513.