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Squeezing a Foal With NMS

Wake up and go to sleep

Ultrasonography Use for the Prepurchase Exam

Rotavirus Guidelines

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WAKE UP AND GO TO SLEEP: Squeezing a Foal with NMS

By Paul Basilio

Foals suffering from neonatal maladjustment syndrome (NMS) go by many names, such as wanderer, barker, or dummy. Their odd behavior resembles a sleepwalking horse—detached, seemingly oblivious, and unable to recognize the mare.

While 80% of foals recover with no lasting neurologic deficits with intensive supportive care and round-the-clock attention, the Madigan Squeeze Technique that uses some rope and a little elbow grease may help foals with NMS recover faster and easier.

But how—and why—does it work?

Prior review articles have diagrammed the mechanisms and damage believed to be associated with the condition, which are extrapolated from non-foal studies involving hypoxic brain injury in other species. As a result, veterinarians have extrapolated data from hypoxic ischemic encephalopathy (HIE)—the human medicine equivalent—to explain many of the condition's characteristics.

"If we extrapolate from human medicine and HIE, we see a completely different picture," said **John Madigan**, DVM, MS, DACVIM, distinguished professor, University of California, Davis, here at the 64th Annual AAEP Convention in San Francisco.

In humans, HIE is a cascade of cellular events, including the release of excitatory amino acids, calcium influx, loss of ionic gradients, failure of ATPase pumps, etc. HIE can affect the gastrointestinal, respiratory and central nervous systems, and death is not uncommon. In addition, long-term neurodevelopment outcomes, such as motor deficits, intellectual problems, speech delays, pain and orthopedic issues, may occur.

"We don't see that in recovering foals with neonatal maladjustment," Dr. Madigan said. "The clinical outcomes of the majority

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DOSAGE AND ADMINISTRATION: Shake well immediately before use. Use immediately after opening, then discard any remaining contents.

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References: 1. Trotter GW. Intra-articular corticosteroids. In: McIlwraith CW, Trotter GW, eds. *Joint Disease in the Horse*. Philadelphia: W.B. Saunders; 1996; 237–256.

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CLINICAL PHARMACOLOGY: Betamethasone is a potent glucocorticoid steroid with anti-inflammatory and immunosuppressive properties. Depending upon their physico-chemical properties, drugs administered intra-articularly may enter the general circulation because the synovial joint cavity is in direct equilibrium with the surrounding blood supply. After the intra-articular administration of 9 mg BetaVet® in horses, there were quantifiable concentrations of betamethasone (above 1.0 ng/mL) in the plasma.

EFFECTIVENESS: A negative control, randomized, masked field study provided data to evaluate the effectiveness of BetaVet® administered at 1.5 mL (9 mg betamethasone) once intra-articularly for the control of pain and inflammation associated with osteoarthritis in horses. Clinical success was defined as improvement in one lameness grade according to the AAEP lameness scoring system on Day 5 following treatment. The success rate for horses in the BetaVet® group was statistically significantly different (p=0.0061) than that in the saline group, with success rates of 75.73% and 52.52%, respectively (back-transformed from the logistic regression).

ANIMAL SAFETY: A 3-week target animal safety (TAS) study was conducted to evaluate the safety of BetaVet® in mature, healthy horses. Treatment groups included a control (isotonic saline at a volume equivalent to the 4x group); 1X (0.0225 mg betamethasone per pound bodyweight; BetaVet®); 2X (0.045 mg betamethasone per pound bodyweight; BetaVet®) and 4X (0.09 mg betamethasone per pound bodyweight; BetaVet®). Treatments were administered by intra-articular injection into the left middle carpal joint once every 5-days for 3 treatments. Injection site reactions were the most common observations in all treatment groups. Injection site reactions were observed within 1 hour of dosing and included swelling at the injection site, lameness/stiffness of the left front limb, and flexing the left front knee at rest. The injection site reactions ranged from slight swelling (in many horses on multiple days in all treatment groups) to excessive fluid with swelling, pain, and lameness (4x group only). Injection site reactions were observed most commonly on treatment days, and generally decreased in number and severity over subsequent days. The incidence of injection site reactions increased after the second and third injection (number of abnormalities noted on day 10 > day 5 > day 0). In the BetaVet® treated groups the number and severity of the injection site reactions were dose dependent. The 4X BetaVet® group had the highest overall incidence of and severity of injection site reactions, which included heat, swelling, pain, bleeding, and holding the limb up at rest. The control group and 4X group (which received similar injection volumes) had a similar incidence of injection site reactions; however, the severity of reactions was greater in the 4X group. Absolute neutrophils were statistically significantly higher in the BetaVet® treated groups as compared to the control group. Trends toward a decrease in lymphocytes and eosinophils, and an increase in monocytes were identified in the BetaVet® treated groups after the initial dose of BetaVet®. Individual animal values for white blood cells generally remained within the reference range. BetaVet® treated horses also had a trend toward increased blood glucose after the initial dose. Some individual animals showed mild increases in blood glucose above the reference range.

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of dummy foals do not support HIE pathophysiology as the etiology."

While the 20% of foals with NMS that die may have a true HIE etiology, it's difficult to identify due to the lack of MRI results, brainwave series, or blood tests in affected foals.

Questions and observations

Why do some foals develop signs compatible with maladjustment syndrome in the absence of obvious hypoxic events? Why do foals recover in a few days with supportive therapy? And why don't veterinarians and owners see long-term neurologic deficits? These are relevant questions, according to Dr. Madigan. The answers may be found in early observational research into NMS, which suggested that a number of affected foals had a hormone disturbance.

Dr. Peter Rossdale's research into risk factors for maladjustment—which were largely based on observation—showed that the disorder was only present in foals that were born with human management. It was unknown in areas—such as Australia in the 1950s—where mares foaled on their own.

Further researched showed that plasma progestogens were elevated in maladjusted foals. In normal foals, levels of plasma progestogens decrease rapidly after birth. One study showed that PaO_2 levels were normal in affected foals—the only abnormality was the levels of the progesterone derivate.

"If we go back to the fetal state," Dr. Madigan said, "the foal must live in a sleep-like unconsciousness that's principally modulated by neurosteroids that act on the GABA receptor, which is the same mechanism as pentobarbital, valium and other sedative compounds."

The foal has to stay asleep for 11 months. However, the foal must rapidly transition from that sleep because it is a prey animal.

"We wondered whether there is a reversal to intrauterine life in foals with maladjustment syndrome," he said. "They start producing the same hormones that they used to produce to keep themselves asleep in utero."

The Madigan Squeeze Technique mimics the foal's trip through the birth canal.

Several studies have since supported the neuroendocrine etiology for maladjustment syndrome. The data pointed to neurosteroids—in some cases, levels were up to 12,000 times higher in maladjusted foals than in age-matched controls.

"They modulate the GABA receptor and produce a sedation and altered consciousness," Dr. Madigan said. "These compounds are sky-high in neonatal foals with maladjustment, as well as in foals with sepsis."

The hypothesis Dr. Madigan and colleagues created was that mild hypoxia in the foal triggers a rise in brain allopregnanolone, the principal neurosteroid that keeps the foal asleep. In addition, physical pressure in the birth canal—or "squeeze-induced somnolence"—triggers safe delivery of the immobilized foal and lowers the levels of the inhibitory neurosteroids.

"It's just like an anesthesiologist dialing down the anesthesia when they know that patient has to wake up shortly," Dr. Madigan said.

Dr. Madigan's research showed foals with NMS continue to increase the precursors to the sedative brain neurosteroid allopregnanolone. "We have monitored foals arriving in our NICU for NMS receiving conventional therapy and found they hourly raise the levels of the precursors. They are reverting to fetal consciousness."

The technique

The final result was the "Madigan Squeeze Technique," in which a soft rope is used to apply pressure to a newborn foal with maladjustment to mimic the trip through the birth canal.

"In our research studies we showed that it is a safe procedure," he explained. "The brainwaves change to a slow-wave sleep at the onset of the procedure. We have evidence that there were several hormone changes that occurred at the end of the 20-minute squeeze. Twenty minutes is also the same duration of Stage 2 labor, where the foals are squeezed in utero."

The investigators also saw a surge in adrenocorticotropic hormone without a surge in cortisol at the end of the 20 minutes, as well as a surge in androstenedione and DHEA sulfate.

"We wondered whether this was a feedback mechanism to tell the foal to quit endogenous production of [the steroids] that kept it asleep for 11 months so that it could wake up and not get immediately attacked by cougars and whatnot," Dr. Madigan said.

In a recent survey comparing this squeeze technique to conventional therapy, 4 of 108 foals receiving conventional therapy were nursing within 1 hour vs. 32 of 87 foals who were squeezed. Dr. Madigan said that this improves foal welfare because many owners globally cannot afford intensive care of these foals.

The method is contraindicated in foals with rib fractures, respiratory distress, congenital abnormalities, and in those with neuromuscular disease that compromises normal breathing. It appears to work best in foals younger than 3 days of age. **MeV**

SEE PAGE 8 FOR THE TECHNIQUE.

Squeezing a Maladjusted Foal: STEP BY STEP*

MATERIALS:

- A soft rope between 5/8- and 3/4-inch in diameter. The rope should slide easily.
  - Tie a bowline knot and make a fixed loop so the rope slides through like a honda knot on a lariat.
- Luggage scale (optional) to gauge pressure.

1

1A

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ROPE PLACEMENT:

- Starting at the withers, place the rope across the neck between the front limbs, and bring the end of the rope up to the withers. (Figure 1)
- Thread the end of the rope through the fixed loop and adjust to a snug fit so there is pressure on the chest but no airway obstruction. (Figure 2)
- Pass the rope over the foal and make a half hitch. Snug the rope just behind the elbow where a cinch would go on a saddle. (Figure 3)
- Pass the rope over the foal's ribcage again about 6 inches back from the first half-hitch and snug it up. (Figure 4)
- Have the assistant hold the foal. Position yourself behind the foal and put pressure on the rope until the foal begins to lie down. (Figure 5)

SQUEEZING:

- Keep the same pressure on the foal when it lies down, and maintain pressure for 20 minutes. (Figure 6)
- Allow the mare to stand close.
- Protect yourself from foal kicking or moving its head. Some foals move once or twice during the 20 minutes.
- When you pull on the rope and the foal begins to lie down, maintain the same pressure. If using a luggage scale, it should register between 10 and 20 lbs.
- Place a towel over the foal's head to cover eyes.
- At the end of the 20 minutes, release pressure on the rope and allow the foal to stay down or get up as it chooses.
- Slowly move the rope away from the foal. Do not force it to get up—allow it to keep sleeping if it chooses.
- Once the foal gets up, allow it to do whatever it wants. Once standing, stimulate the foal as the dam does by pinching on the rump with your fingers to it. Let the foal find the udder and nurse on its own.
- If the foal improves, then begins to relapse, repeat the procedure. Dr. Madigan has done 4–6 squeeze procedures over 24 hours to assist the transition to post birth consciousness.

6

All images courtesy of Dr. John Madigan

*Adapted from Madigan JE, et al. Proceedings. Am Assoc Equine Pract 2018;64:249-252.

AAEP Publishes Rotavirus Guidelines

The American Association of Equine Practitioners published comprehensive guidelines for the identification, management and prevention of rotavirus, a leading cause of diarrhea in foals up to 6 months of age at horse breeding centers worldwide.

The Rotavirus Guidelines conveniently summarize the disease's clinical signs, risk factors, diagnostic methods, control measures, biosecurity issues and other management protocols.

"Foal diarrhea remains a disease of enormous significance to the horse industry," said **Roberta Dwyer**, DVM, MS, DACVPM, equine extension veterinarian and professor at the University of Kentucky. "Rotavirus is one of the most common pathogens in major breeding areas worldwide. Early recognition, diagnosis, treatment and biosecurity in cases of foal diarrhea are keys to minimizing disease impacts to breeding farms."

Equine rotavirus is transmitted by the fecal–oral route. The virus damages cells in the small intestine causing maldigestion, malabsorption and diarrhea. The incubation period is as little as 12 hours.

Clinical signs include watery-to-hard diarrhea, lethargy, decreased desire to nurse; dehydration and electrolyte imbalances. Uncomplicated cases typically do not have blood in the stool. Some foals might have fever, but it is an inconsistent finding.

Up to 70% of foals in the United States will suffer at least 1 episode of diarrhea before weaning. Up to 50% are susceptible to rotavirus, but mortality is very low (<1%), according to the AAEP. Disease is more severe in foals younger than 7 days.

The guidelines provide information on diagnostic sampling, testing and handling, as well as biosecurity measures. Remember to advise owners about biosecurity to protect other animals on the farm. **MeV**

Photo courtesy of AAEP

For more information:

The AAEP Infectious Disease Guidelines: Rotavirus is available on the AAEP website:
https://aaep.org/sites/default/files/Documents/Rotavirus%20Guidelines%20-%202019.pdf

Modern Equine Vet & Purina Team Up to Answer Your Nutrition Questions

A horse's diet is the basis for a well-functioning body. Food is the source of energy for the horse and directly affects every stage in the horse's life. A healthy diet is important to prevent some diseases, maintain a healthy weight and help the animal enjoy a good long life.

But the nutritional needs of each horse differ depending on age and work, among other factors. So what should you recommend?

Get your questions answered in our new column on horse nutrition, sponsored by Purina. E-mail your questions to **Marie Rosenthal, Editor**. And watch for answers beginning in June.

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MAPPING THE BRANCH:

Ultrasound protocol for a Sport Horse Pre-purchase Exam

By Paul Basilio

Whether it's a chronic, slight decline in performance or an acute career-threatening injury, suspensory ligament desmitis is a common finding in sport horses. Signs may be subtle at the time of purchase, so a thorough pre-purchase examination is vital to identify the condition and inform all parties involved.

"Like it or not, routine imaging [in a pre-purchase exam] is here to stay," said **Melissa Welker**, DVM, from John R. Steele and Associates Equine Sports Medicine in Vernon, NY. "I perform ultrasound on 95% of the pre-purchase exams I do. I also interpret more pre-purchase exams than I personally perform, since my clients typically buy in other countries. There are almost always ultrasound results accompanying the reports."

The role of ultrasonography

Different veterinarians consider different issues during pre-purchase exams because a real standard or protocol is lacking.

"I tend to perform ultrasound after the clinical exam and before I take the x-rays," Dr. Welker said here at the 64th Annual AEEP Convention in San Francisco. "I like to sedate the horse for ultrasound examination of the hind limbs. That leaves a sedated horse for my technicians in case cervical radiographs or something similar are needed."

In a horse with a clinical concern, more images are likely to be taken of a specific area. As an adjunct tool for the clinical exam, an ultrasound survey typically can help support clinical findings.

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Finding your protocol

"Consistency is key," Dr. Welker said. "If you can develop an ultrasound protocol similar to your radiograph protocol that you follow for every pre-purchase examination, then you eventually get to the point where the survey is as comfortable to you as [any other] study. You become fast at it, as well as efficient. When you need to look back and refer to or compare images, it works in your favor."

Dr. Welker typically starts with an unsedated horse. She will ultrasound the suspensory origin and ensure she can visualize the medial and lateral lobes in the forelimb. While a traditional weight-bearing, transverse view will work, she prefers the non–weight-bearing views for these lobes.

For the body of the ligament, she prefers the mediolateral approach over the palmoplantar approach, as she tends to be able to visualize more structural information that way. After that, she will move to the insertion of the suspensory ligament into the sesamoids, where the bone-ligament interface can be evaluated.

"I'm not a big measurer," Dr. Welker said. "Measurements are tough, because they are so variable. There is a big discrepancy in what is normal—especially in the Warmblood horse."

A measurement in the long and the transverse view may be helpful, but she cautioned against condemning a horse based on measurements.

"Limb-to-limb comparison is important," she added. "If you are measuring or even just scanning in a survey, it's important to have comparisons of the horse's limbs."

Dr. Welker opts to perform both weight-bearing and non–weight-bearing palpation during the clinical exam, followed by a dynamic observation of the horse on hard and soft surfaces. Many horses exhibit more lameness on hard ground versus soft, especially under tack.

"This allows my brain to start to form an idea of whether this is a bone-ligament-interface issue, suspensory issue, or a soft-tissue issue. When you have the deeper footing, then that puts strain on the soft tissue."

She will observe the horses statically in the stable and palpate the soft tissue while the horse is standing. This occurs before exercise and then again during the examination.

"If I have suspicion of a suspensory problem, I will often go back and palpate that structure again," she said. "Sometimes I will add some flexion through digital pressure, and then trot the horse under tack. I like to see the horse doing its job."

After exercise assessment, she often finds many of the suspensory issues that could be palpated statically in the stable are gone after the horse has moved around. It also gives her an indication of how serious the suspensory ligament is affected.

The clinical exam

Dr. Welker stressed that while ultrasonography is a valuable tool in the pre-purchase exam, the clinical examination is still the most important part.

"Ultrasound does not take the place of you putting your hands on that horse, palpating it, doing flexions, and performing gait analysis," she said. "Don't forget that this is an evaluation of a functioning sport horse. The veterinarian may not think the horse is functioning as well as the buyer and the seller do. Nevertheless, your job on that day is to evaluate a functioning sport horse." **MeV**

Using Gentamicin Injections Appear Effective for Uveitis

By Adam Marcus

Low-dose injections of gentamicin can treat equine uveitis as effectively as more invasive therapies, with a low risk of recurrence or complications, new research shows.

Equine recurrent uveitis (ERU) is among the most prevalent eye diseases in horses, affecting an estimated 2% to 25% of animals in the United States, according to the Veterinary Health Center at Kansas State University in Manhattan.

Many veterinarians opt for an initial course of antibiotic therapy, whereas some clinicians may chose to implant a suprachoroidal disc that releases cyclosporine. Neither approach is ideal for every horse, however, and many horses develop cataracts, retinal damage or other ocular problems that lead to permanent blindness.

Another surgical procedure, pars plana vitrectomy (PPV)—which entails removal of vitreous material from the eye—can be successful in some cases, particularly in animals infected with leptospiral organisms. A component of PPV is to irrigate the eye in gentamicin, and recent research has suggested that injections of low doses of the the antibiotic might be sufficient to treat ERU.

Recurrent uveitis is among the most prevalent eye diseases in horses.

Using gentamicin

The new study, from a team at the College of Veterinary Medicine at Auburn University in Alabama, assessed the safety and effectiveness of injecting 4 mg of gentamicin (IVGI) into the vitreous of horses with recurrent or refractory uveitis. They evaluated 86 horses for immediate complications associated with IVGI, but only 59 horses were evaluated for long-term complications.

Most horses (52/59; 88.1%) that received the injections had their ERU controlled within 30 days of treatment, according to the researchers. Five animals (8.5%) experienced recurrent inflammation and 2 (3.4%) had persistent inflammation of the eye.

The researchers, who reported their findings in *BMC Veterinary Research*, noted that complications—in particular, the progression of cataracts—appeared to be associated with the use of gentamicin containing preservatives. When they switched to a version of the antibiotic that did not contain such chemicals, they found only 1 case of progressive cataracts (1.9%).

Richard J. McMullen Jr., DVM, an equine ophthalmologist at Auburn who helped conduct the study, said he was initially surprised by the rapid onset and effectiveness of the therapy. "I only began utilizing this treatment out of necessity, and the fact that I had a few horses that were not candidates for either a PPV or a suprachoroidal cyclosporine implant and which were non-responsive to aggressive and appropriate medical therapy," Dr. McMullen said.

Dr. McMullen said he was concerned that IVGI would lead to significant side-effects, particularly retinal toxicity and cataracts, but those complications occurred infrequently. "It was quite impressive to watch the eyes quiet down and become less painful within 24–48 hours of the IVGI. This is something that I am still overwhelmed by. The intraocular reaction to the IVGI appears to be immediate. Now we just have to figure out why."

The researchers suggest that "rather than having a direct bactericidal effect on putative bacterial organisms, gentamicin instead appears to influence or interfere with the immune-mediated processes intrinsic" to equine uveitis. "Although purely speculative, the underlying mechanism of action of gentamicin may block or suppress the activation of specific T-cell lines; cells that are known to play a significant role in autoimmune uveitis."

However, Dr. McMullen said that despite the apparent success of IVGI, clinicians should proceed with caution. "All uveitis is not ERU and many corneal diseases will be accompanied by a significant uveitic component," he told the *Modern Equine Vet*. "Without a definitive diagnosis, many horses may be subjected to unnecessary complications associated with IVGI. The IVGI has changed the way that we approach uveitis in horses, but there are significant risks/benefits that must be considered, prior to and following the establishment of an accurate diagnosis." **MeV**

For more information:

Fischer BR, McMullen RJ, Reese S, et al. Intravitreal injection of low-dose gentamicin for the treatment of recurrent or persistent uveitis in horses: Preliminary results *BMC Vet Research 2019* Jan 16 https://bmcvetres.biomedcentral.com/articles/10.1186/s12917-018-1722-7

For more on equine uveitis: **https://www.vet.k-state.edu/vhc/services/equine/timely-topics/moon-blindness.html**

Case Presentation: Standing MRI Case Studies

By Sally Schwartz, CVT

The standing MRI has added a new component to diagnosing lameness because it can be done under standing sedation and provides a quality image of what is going on with the animal.

While MRI is usually not your first choice for a reoccurring lameness it shouldn't be your last either. The Wisconsin Equine Clinic and Hospital has been doing standing MRI using a Hallmarq scan for years.

Considerations for MRI:

1. Lameness that has been well-documented, localized and defined by blocking
2. Access by ultrasound is difficult or impossible
3. Acute onset of lameness after exercising
4. Penetrating injury that needs urgent attention
5. Lameness that is not responding to treatment as hoped and
6. Radiographs are inconclusive.

Once the patient arrives at the hospital, the doctor has a pretty good idea of what area needs to be scanned. This is based on conversations with the referring veterinarian, owner, trainer and farrier. On occasion, additional diagnostic work-ups are performed.

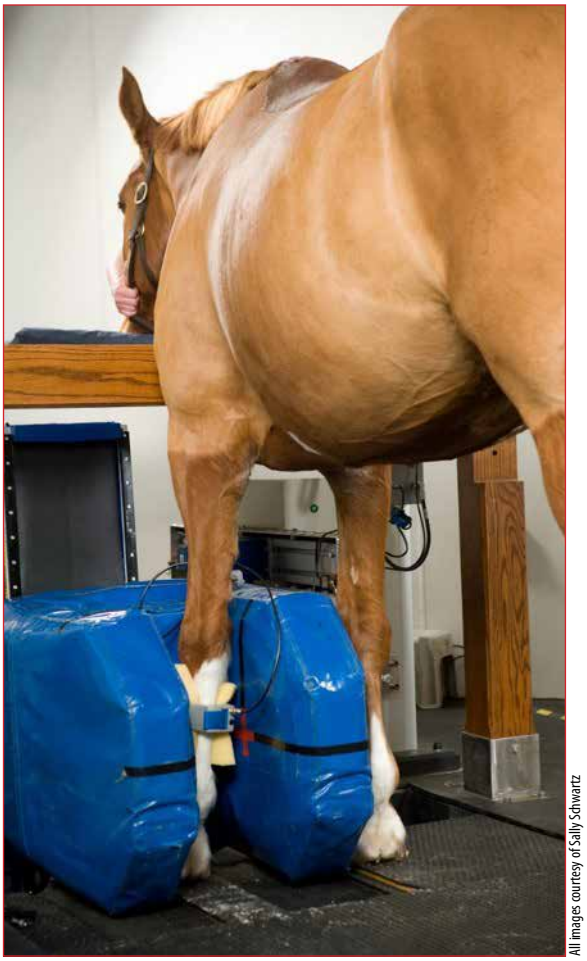
Shoes are removed from both feet. Depending on what we are scanning, a quick 60° DP is taken to check for residual metal from pulling shoes.

An IV catheter is placed. The horse is walked into the MRI Room. Our room is fairly large so the horses can turn around easily and check things out.

Sedation will vary from patient to patient. At our hospital we use a combination of romifidine, detomidine and butorphanol. Dosage depends on horse temperament and size. A CRI of detomidine is often used. No two horses are the same, so there is no perfect cocktail to have them stand quietly. At times it can be trial-and-error to see what works best on that patient.

Once sedated it is important that the horse stands squarely in the magnet. We take our time and try not to rush. Initial positioning is important to the quality of the scans. Once settled in and standing correctly the coil is attached and aligned with the foot and scanning begins. It will take approximately 45 minutes to scan the foot of a quiet horse. The pastern takes about 45 minutes and the fetlock will take an hour. We routinely scan the contralateral limb for reference if the patient is calm, we can scan the foot, pastern and contralateral foot in about 3 hours.

In our practice, the most common MRI diagnoses



All images courtesy of Sally Schwartz

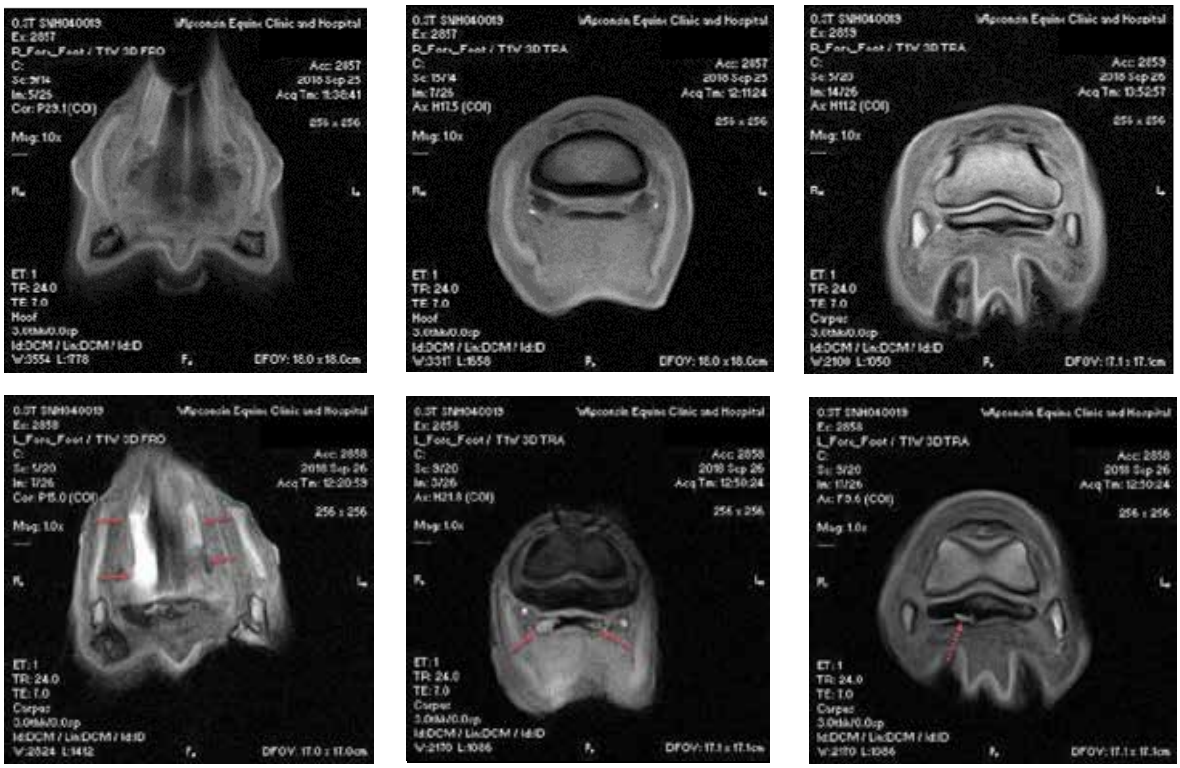
Standing MRI

in the foot are:

1. Navicular bone degeneration, navicular cysts
2. DDFT tendonitis/and or tears
3. Navicular Bursa scarring and adhesions, bursitis
4. Bone bruising
5. Coffin-bone inflammation or coffin-bone fractures
6. Traumatic arthritis
7. Laminitis or founder
8. Sepsis

Case 1: 10-year-old, QH, Gelding

History: For the past 2 years owner has reported an on-again, off-again lameness. The horse would walk out of the stall lame but would warm out of it only to become lame again after increased exercise. The referring veterinarian had seen the horse in spring 2016. He was 1/5 lame in the LF. Radiographs that were taken at that time—which showed a severely broken back angle—the dorsal coffin joint was almost closed and there were



Various views of case 1

arthritic changes on P2 and P3. Numerous shoeing changes and injections were done over the years to aid in his comfort and soundness.

On the day of presentation he was 3/5 lame on the LF. A PD block resolved the lameness but then he was 2/5 on the RF. It was decided to go to MRI at this point.

Sedation: He was a very easy horse to work with. He was given 10 mg of romifidine to place him in the magnet. Due to a conformational issue, it made him buckle his RF knee. We gave him a bit of time to get his legs under him and maintained him with detomidine and butorphanol.

Diagnosis: Severe bilateral tears of the deep digital flexor tendons.

Treatment: Due to the severity of his injuries and inability to maintain comfort for him long-term, his owners opted to take him home and humanly euthanize him.

Case 2: 14-year-old Arabian mare

History: A LF lameness that dates back to 2012. Over time that lameness was treated with injections.

June 2018: LF lameness was 3/5. An abaxial block was done and did not change the lameness. The fetlock joint was blocked and improved about 80%. The LF carpus was blocked and did not change the lameness. It was decided to inject the fetlock joint with PRP.

August 2018: Ultrasound of the LF fetlock was unremarkable. The joint was injected with Arthromid and Depo Medrol. A recheck one week later showed a 1/5 lameness on the LF. Shockwave therapy was performed.

September 2018: The horse presented 2/5 lame on the LF. After flexion of the fetlock joint she was 3+/5 lame. Mild effusion was noted in the joint. Radiographs from referring veterinarian showed some mild arthritis. It was decided to go to MRI.

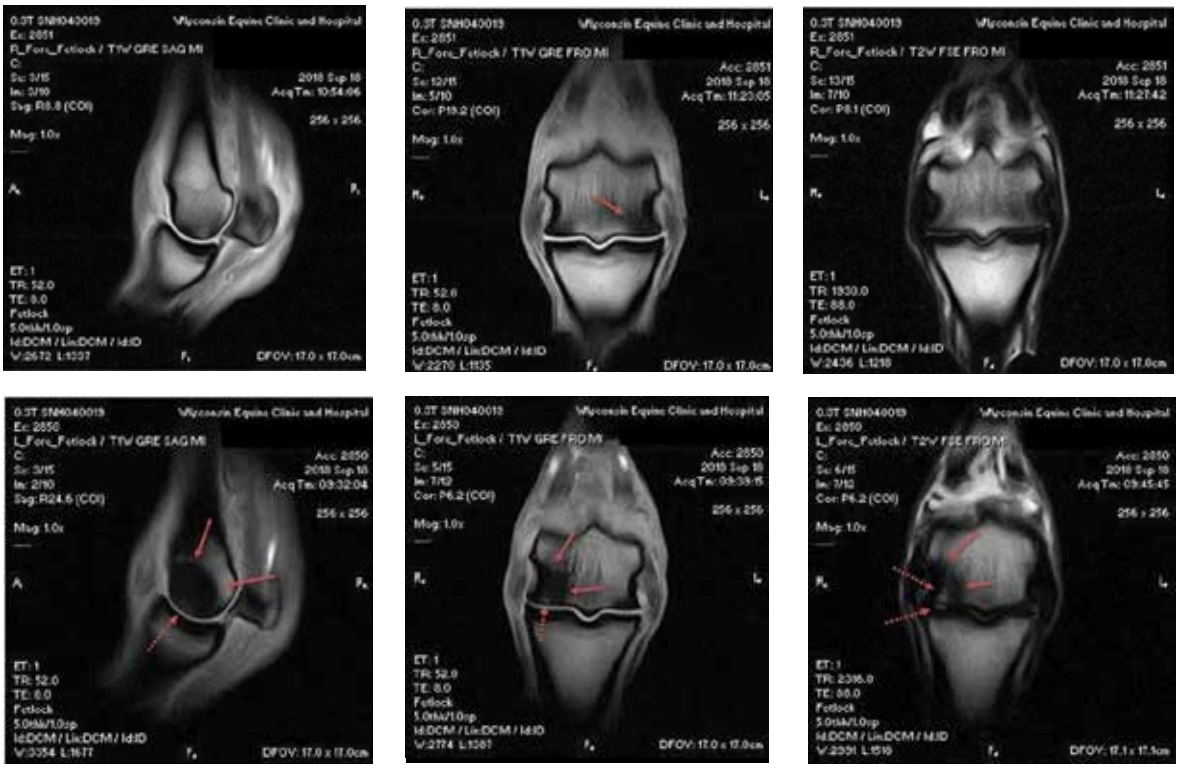
Sedation: This was a very nice mare to work with and sedated easy. She was given a 5 mg of detomidine and 2 mg butorphanol to place in the magnet. She was maintained on a CRI of detomidine. 10 mg detomindine in a 250 mL bag of 5% dextrose dripped to effect.

Diagnosis: Severe arthrosis/ osteoarthritis of the LF fetlock joint.

Treatment: The referring veterinarian was to do all the follow-up care. It included Tildren and shockwave therapy. A loading dose of Adequan was also suggested. Hand walking and stall rest were recommended. MRI reevaluation was recommended in 3–4 months.

Case 3: 4 year old Welsh pony, Mare

History: October 2017 owner notes that pony is lame—head bobbing at the trot under saddle. The owner also noted difficulty lunging. On the lunge line the pony was 1/5 on the LF at a walk, 4/5 on the LF at a trot on in both directions. She was negative to flexions. A LF PD resolved the lameness. Radiographs were taken and



Case 2

Case 3

Teaching Points

Our MRI images are read by a board-certified radiologist. Our senior surgeon looks at images as well. Report turnaround time is about 24 hours.

Most of our clients leave with a good understanding of what was found during imaging. We leave treatment up to the client and referring veterinarian. We will gladly assist in treatment if asked to do so.

Insurance companies are covering more MRIs than they did before. Each owner does need to check with their carrier.

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showed a possible avulsion fracture off the lateral wing of the coffin bone.

June 2018: Owner notes no real improvement of lameness after having the winter off. On the lunge line she was 1/5 LF at a walk and 3+/5 at a trot . Radiographs were taken and showed a navicular cyst on the LF. Osphos was given.

October 2018: Pony was 3/5 lame on the LF . Referring veterinarian called and discussed the case, and it was decided to come in for a second opinion and MRI.

On presentation she was 2/5 lame at a walk. PD block resolved lameness. Her ongoing issues were discussed and it was decided to proceed to MRI.

Sedation: She was a very opinionated pony—difficult to sedate. She received 10 mg of romifidine, 2 mg detomidine and 2 mg butorphanol to place in the magnet. She then was placed on a CRI of 10 mg detomidine in a 250 mL bag of 5% dextrose dripped to effect. She would periodically pull her leg and back out of the magnet.

Diagnosis: Significant navicular cyst LF

Treatment: Osphos was given and recommended repeating monthly for 3 treatments. The owners were asked to work with the horse's farrier to find shoes that would aid in her comfort. Equioxx can be given for long-term pain management. It was recommended that she have turn out but no forced exercise at this time. Reevaluation was recommended in the spring. **MeV**

About the authors

Sally Schwartz CVT, has been a certified veterinary technician since 1987 and has been working at Wisconsin Equine Hospital for the past 24 years specializing in surgery, anesthesia and lameness. She is happily married with two grown children, and an array of four-legged furry critters.

Why Asian Horses Don't Get Sick With the Flu

Avian influenza viruses infect horses in Mongolia but do not cause large outbreaks of disease because they fail to acquire key genetic changes that enable greater cross-species transmissibility.

To better understand how influenza A viruses circulate in nature and the ecological and evolutionary factors mediating viral emergence, researchers from the MRC-University of Glasgow Centre for Virus Research sequenced more than 20 avian influenza viruses collected from wild birds in Mongolia. By combining field studies, phylogenetics and experimental infections, they documented with unprecedented detail the stages that precede initial outbreaks during viral emergence in nature.

The results revealed that the avian influenza viruses are genetically related to a virus that caused an equine influenza outbreak in 1989. Experimental infections showed that most avian influenza viruses replicate in the respiratory tract of the horse without causing any tissue damage. Moreover, horses in Mongolia have been regularly exposed to them over a broad geographical area without causing clinically evident outbreaks. The findings suggest that equine infections by avian viruses able to replicate in horses are more common than originally thought, and that the failure to acquire key genetic changes is the main barrier to disease emergence. According to the researchers, surveillance efforts should be directed to monitor for the presence of horse-adaptive mutations in viruses derived from birds.

For more information:

Zhu H, Damdinjav B, Gonzalez G, et al. Absence of adaptive evolution is the main barrier against influenza emergence in horses in Asia despite frequent virus interspecies transmission from wild birds. *PLoS Pathog. Epub* Feb 7, 2019.

https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1007531

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- Inform Members of issues affecting our profession
- Assist in providing the best medical care to improve the health and welfare of the horse

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