2026 CONTINUING EDUCATION SEMINAR

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LECTURE NOTES

(ORGANIZED CHRONOLOGICALLY BY TIME SLOT)

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8:05 - 9:05am

Podiatry Case Studies (Sponsored by Shreiber School of Veterinary Science)

Patrick Reilly, GradDip. ELR

Abstract

The concept of hoof balance remains one of the most debated topics in equine podiatry. Farriers, veterinarians, and horse owners have long sought methods to optimize hoof form and function, yet no universal agreement exists regarding the ideal parameters of hoof balance. Traditional approaches have relied heavily upon static assessments, practitioner experience, and discipline-specific preferences. Recent advances in gait analysis technologies, however, offer opportunities to evaluate hoof-care interventions using objective, evidence-based metrics. These technologies provide insight into the dynamic response of individual horses and may improve communication between farriers and veterinarians.

A major challenge in evaluating hoof balance is the influence of time. Hoof growth continuously alters hoof geometry between trimming and shoeing intervals, resulting in measurable changes in limb biomechanics. Research has demonstrated that hoof angle decreases, breakover migrates dorsally, and loading patterns change significantly over a typical shoeing cycle. These changes may increase strain on musculoskeletal structures and complicate efforts to define a universally “balanced” hoof.

This paper reviews the challenges associated with defining hoof balance, discusses the effects of hoof growth and time on locomotion, and explores the potential role of gait analysis as a tool for evidence-based hoof care. Particular emphasis is placed on the role of farriers as regular data collectors who can contribute meaningful longitudinal information to collaborative veterinary care.

Introduction

Few concepts in equine hoof care generate as much discussion as hoof balance. Despite centuries of practice and study, there remains little consensus regarding what constitutes an optimally balanced hoof. Traditional farriery has relied upon visual assessment of hoof conformation, limb alignment, wear patterns, and practitioner experience. Similarly, veterinarians often evaluate hoof balance through static examination, radiographic measurements, and clinical interpretation. While these approaches provide valuable information, they frequently result in differing conclusions regarding appropriate hoof management.

Hoof balance is commonly defined as the relationship between the hoof capsule and the skeletal structures of the distal limb, particularly within the dorsal-palmar and medio-lateral planes. The objective of balancing the hoof is generally to promote efficient locomotion, minimize excessive loading of musculoskeletal structures, and support long-term soundness. However, because horses vary widely in conformation, athletic discipline, environment, and management practices, defining a single ideal balance for all horses is likely unrealistic.

Recent developments in gait analysis technology have introduced new opportunities to evaluate hoof-care interventions objectively. Motion analysis systems, inertial measurement units (IMUs), force-measuring devices, and pressure analysis systems can quantify changes in locomotion associated with trimming and shoeing. These technologies may provide a more evidence-based framework for understanding hoof balance and evaluating the effects of podiatric interventions over time.

The Challenge of Defining Hoof Balance

Historically, hoof balance has been assessed using static reference points such as hoof-pastern alignment, solar symmetry, coronary band orientation, and radiographic measurements. While these assessments remain useful, they do not necessarily predict how a horse will move under dynamic conditions.

One of the greatest challenges in hoof-care decision making is the large number of extrinsic factors that influence locomotion. Variables including rider presence, rider skill, training intensity, footing characteristics, environmental conditions, and equestrian discipline all influence movement patterns. Horses competing in dressage, show jumping, racing, and western performance events place different biomechanical demands on their limbs and feet.

In addition, environmental conditions can significantly influence hoof morphology. Horses maintained primarily on soft pasture may develop different hoof characteristics than those worked regularly on firm arena surfaces. Seasonal changes in moisture content, exercise levels, and turnout duration further contribute to variation in hoof growth and wear.

These numerous variables complicate efforts to identify a single “correct” hoof shape or trimming protocol. Instead, hoof balance should perhaps be viewed as a dynamic state that must be continually adapted to the individual horse and its environment.

Time as a Critical Variable

While practitioners often focus on the hoof at the moment of trimming or shoeing, the hoof is continuously changing throughout the shoeing interval. Consequently, any assessment of hoof balance represents only a single point in time.

Hoof horn grows approximately 6–10 mm per month, resulting in measurable changes in hoof geometry during a standard four- to eight-week shoeing cycle. Van Heel and colleagues demonstrated that hoof angle may decrease by approximately 3.8 degrees over a six-week interval, accompanied by substantial changes in hoof proportions and loading characteristics (Van Heel et al., 2004).

Similarly, the location of breakover migrates progressively forward as the hoof grows. Studies have reported dorsal migration exceeding one centimeter during a typical shoeing interval. Although this displacement may appear small, its biomechanical consequences can be significant.

As breakover moves dorsally, the lever arm acting on the distal interphalangeal joint increases. This results in greater forces being required from the deep digital flexor tendon (DDFT) to initiate hoof rollover during locomotion. O'Grady and Poupard (2003) emphasized that alterations in breakover can substantially affect loading patterns within the distal limb.

Wilson and colleagues demonstrated that even relatively small changes in hoof geometry can alter tendon loading and joint mechanics. One study estimated that a six-week period of hoof growth resulted in approximately a 16% increase in the force required by the DDFT during breakover in the forelimbs, whereas the increase in the hindlimbs was only approximately 1.9%. Such findings highlight the complexity of hoof balance and suggest that forelimb and hindlimb management may require different considerations.

These observations raise an important question: if hoof balance changes continuously throughout the shoeing cycle, can a horse ever truly be considered balanced? More realistically, practitioners may need to view hoof care as the management of changing biomechanics over time rather than the achievement of a static ideal.

Gait Analysis as an Evidence-Based Tool

Advances in technology have created new opportunities to objectively evaluate the effects of trimming and shoeing interventions. Modern gait analysis systems can quantify stride characteristics, limb movement symmetry, stance duration, acceleration patterns, and loading forces.

Inertial sensor systems have become particularly useful because they can be employed in field conditions rather than specialized laboratory environments. These systems can collect data while horses are exercised in their normal training settings, providing information that may be more representative of everyday performance.

Objective gait analysis offers several advantages over subjective visual assessment. Human observers are limited in their ability to detect subtle changes in locomotion, particularly when asymmetries are mild. Studies have demonstrated considerable variability among experienced clinicians evaluating the same horse. Quantitative gait analysis provides repeatable measurements that can be compared over time and between practitioners.

Importantly, gait analysis should not be viewed solely as a lameness detection tool. It may also be used to monitor responses to routine hoof-care interventions. By collecting baseline measurements and monitoring changes across successive shoeing cycles, practitioners may gain insight into how individual horses respond to specific trimming techniques, shoeing strategies, or orthotic applications.

This approach aligns closely with the principles of evidence-based practice. Rather than relying exclusively upon tradition or anecdotal experience, clinicians can evaluate interventions based upon measurable outcomes.

The Role of the Farrier in Longitudinal Data Collection

Farriers occupy a unique position within the equine healthcare team. Unlike veterinarians, who often evaluate horses primarily during episodes of illness or lameness, farriers typically visit horses at regular intervals throughout the year. These routine visits provide valuable opportunities for longitudinal data collection.

Repeated gait assessments performed during preventive hoof-care appointments can establish an objective record of locomotor function over time. Such records may reveal subtle trends that would otherwise go unnoticed. Gradual deterioration in symmetry, changes in stride characteristics, or altered loading patterns may become apparent months before overt lameness develops.

The collection of objective data by farriers can also improve communication with veterinarians. Historically, discussions regarding hoof balance have sometimes been hindered by differences in terminology or subjective interpretation. Quantitative measurements provide a common language through which practitioners can discuss biomechanical changes and treatment outcomes.

For example, a farrier documenting changes in stride symmetry before and after a shoeing intervention can provide objective information to an attending veterinarian evaluating a performance issue. Similarly, veterinarians can use these records to assess the effectiveness of medical treatments or rehabilitation programs.

Such collaboration is increasingly important as equine healthcare becomes more multidisciplinary. The most successful outcomes often result from coordinated efforts among veterinarians, farriers, trainers, riders, and owners. Objective gait data can facilitate these partnerships by providing measurable information that supports clinical decision making.

Conclusion

The concept of hoof balance remains complex and often controversial. Traditional approaches based primarily on static assessment have provided valuable guidance but are limited by the dynamic nature of hoof growth and locomotion. Time itself represents a major variable, as hoof geometry changes continuously throughout the shoeing cycle, altering biomechanical forces acting upon the distal limb.

Emerging gait analysis technologies offer new opportunities to evaluate hoof-care interventions objectively and to better understand how individual horses respond to trimming and shoeing strategies. Rather than seeking a universal definition of hoof balance, practitioners may benefit from focusing on measurable functional outcomes and longitudinal monitoring.

Farriers are uniquely positioned to contribute to this process through routine data collection during preventive hoof-care visits. When combined with veterinary assessment, objective gait analysis can enhance communication, support evidence-based practice, and improve the collaborative management of equine athletes. Ultimately, the integration of gait analysis into routine hoof care may help shift the profession from opinion-based decision making toward a more scientific understanding of equine podiatry.

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8:05 - 9:05am

Separating Fact from Fiction in Equine Nutrition: Evidence-Based Answers for Common Client Questions (Sponsored by Standlee)

Kelly Vineyard, MS, PhD

Client conversations increasingly compete with social media-driven misinformation shaped by anecdote, trend, and well-intentioned but poorly sourced advice. When navigating these conversations, having evidence-based talking points will help clinicians to address these topics with clarity and confidence.

Inflammatory Ingredients: Soy, Grains & Oils

Client question: *"Is soy inflammatory? Should I stop feeding grain? What inflammatory oils should I avoid?"*

There are currently no studies that support claims that soy, grain, or vegetable oils are inherently "inflammatory" when fed at standard inclusion rates. Soybean meal is one of the best and most complete dietary protein sources for horses, due to its high-quality amino acid profile and digestibility. The real concern related to "grain and inflammation" is due to starch overload. When dietary starch from grain exceeds small intestinal digestive capacity, it moves into the hindgut where it ferments, which drives acidosis, dysbiosis, and endotoxin-mediated systemic inflammation. This is a meal size and management issue, not a specific ingredient issue. Vegetable oils are also not inflammatory on their own, but rather the more important variable is the overall omega-6 to omega-3 ratio of the entire ration.

Key takeaway: *Redirect the conversation from focusing on or avoiding a single ingredient to effectively meeting nutrient requirements, proper meal size and sugar/starch content, and overall essential fatty acid balance. Eliminating ingredients based on unfounded concerns needlessly complicates the process of feeding a balanced, appropriate ration.*

Alfalfa: "Hot," Kidneys & Metabolic Risk

Client question: *"Does alfalfa make horses hot? Cause kidney damage? Is it too rich for my metabolic horse?"*

No controlled evidence links dietary protein to "hot" behavior, but some horses might respond to excess calories in the diet with more reactive behavior. Alfalfa contains more calories per pound than grass forage, so it's possible that large amounts of alfalfa hay could contribute more calories than the horse needs. Healthy horses handle excess protein by excreting nitrogen as urea in urine, and this becomes a concern only for horses with pre-existing renal disease. Alfalfa hay is lower in nonstructural carbohydrate content than many grass hays, making alfalfa a reasonable forage option for insulin-dysregulated horses.

Key takeaway: *Alfalfa doesn't make horses hot, but excess calories in the diet might. Alfalfa does not cause kidney damage but should be avoided or fed in moderation to horses with kidney disease. Alfalfa is not automatically off-limits for a metabolic horse, especially if they need extra calories.*

Beet Pulp: Aluminum & "Swelling in the Stomach"

Client question: *"Does beet pulp contain dangerous aluminum? Will it swell and rupture the stomach?"*

The concern that beet pulp's aluminum content harms horses is common in owner forums but is not well supported by controlled equine research. Studies in horses have reported no adverse effects at aluminum intakes far above what beet pulp alone typically contributes (Schryver *et al.* 1986). The stomach empties well before pulp fully expands and feeding trials with beet pulp comprising 45–55% of the diet (equivalent to approximately 12 lbs) have reported no adverse effects (NRC 2007). Choke is a legitimate risk with any rapidly ingested, poorly chewed feed that does not get properly moistened by saliva, but this is not limited to just beet pulp. Soaking beet pulp to soften it prior to feeding is recommended to improve palatability and minimize risk of choke.

Key takeaway: *Aluminum in beet pulp does not pose a toxicity risk at normal feeding rates. Soaking beet pulp is a reasonable palatability/choke-prevention practice, but it is not required to prevent stomach rupture.*

Iron: "Sluggish" Horses & Insulin Resistance

Client question: *"My horse seems sluggish, should I supplement with iron? Does high dietary iron cause insulin resistance?"*

True iron deficiency is rare in horses. Forage alone typically supplies levels well above the NRC requirement, and iron absorption is tightly regulated by hepcidin. Fatigue attributed to "low iron" is almost never a true deficiency and warrants a workup for other causes, and chronic blood loss from ulcers or parasites is the more likely culprit if a true deficiency is confirmed on a complete iron panel. With insulin resistance, elevated ferritin has been observed in insulin-dysregulated horses (Kellon and Gustafson 2019), but correlation does not establish causation. One study looked at nearly 2,000 racehorses consuming roughly 10 times their iron requirement and reported no cases of insulin resistance (IR) (McLean *et al.* 2022). Currently, there is no evidence that excess dietary iron alone causes IR.

Key takeaway: *Skip the iron-rich "blood builder" supplements for increasing energy; reserve iron supplementation for a diagnosed deficiency or documented blood loss. For horses with IR, there's no need to attempt to eliminate iron from the diet. Focus on proven interventions like weight management, exercise, and controlling soluble carbohydrate intake instead.*

Vitamin E: When and What to Supplement

Client questions: *"Should I feed vitamin E to all the horses in my barn just to 'be safe'? Will vitamin E fix my horse's muscle issues? Which form of vitamin E is best?"*

Vitamin E needs are highly individual and driven primarily by pasture access and the horse's ability to metabolize dietary vitamin E. Horses with regular access to fresh, green pasture typically meet requirements naturally, but vitamin E in hay begins to decline within weeks of cutting, leaving many stalled or dry-lot horses genuinely at risk for deficiency, especially if they are not being fed a fortified feed or supplement with adequate vitamin E. Supplementing an entire barn without assessing individual pasture access, workload, and (ideally) serum vitamin E status is an oversimplified fix that can unnecessarily treat horses who don't need it while not identifying which individuals actually warrant monitoring. Muscle soreness and atrophy are symptoms of vitamin E-responsive myopathy, but reflexive vitamin E supplementation without conducting a diagnostic workup could result in not identifying a more serious or unrelated underlying condition. Natural-source vitamin E (d-alpha-tocopherol) is consistently more bioavailable than synthetic (dl-alpha-tocopherol) forms. The synthetic form of vitamin E is more

shelf stable and heat resistant, which is why it is used in most commercial fortified feeds. It's still absorbed and utilized by the horse, just less efficiently. That works for baseline dietary fortification, but natural-source is worth the added cost when maximal absorption is needed to correct a deficiency or address a specific need.

Key takeaway: *Assess vitamin E status individually rather than blanket-supplementing the entire barn. Don't treat undiagnosed muscle issues with vitamin E alone. Utilize natural-source vitamin E formulations when supplementation is genuinely indicated.*

Food Allergy and Serum Testing

Client question: *"My horse's serum allergy test shows an allergy to several forages and feed ingredients — what do I feed now?"*

Serum IgE-based allergy testing has not been validated for diagnosing food allergies in horses. Serum from the same healthy ponies, submitted to a commercial laboratory on two separate occasions, produced inconsistent results, with different ingredients flagged "positive" each time despite no known allergies in any pony (Dupont *et al.* 2016). An accurate diagnosis of a food allergy requires an elimination diet, which consists of a baseline forage-only diet fed for at least 4 weeks (or until symptoms resolve), followed by the reintroduction of no more than one "suspect" ingredient or feed per week to gauge symptom recurrence. If no reaction occurs, a food allergy is unlikely.

Key takeaway: *An elimination diet, not a serum panel, is the only reliable method for confirming a true food allergy. Discourage broad, multi-ingredient restrictions based on serum results alone, as this will needlessly complicate the process of feeding a balanced, appropriate ration.*

Home-mixed Rations in Place of Commercial Feed

Client questions: *"I want to avoid commercial feeds, aren't they full of fillers? What do you recommend I feed instead?"*

Commercial feeds are not inherently less healthy, and the ingredient list is often more familiar than owners assume. Reputable commercial feeds are typically built from a small set of core ingredients (alfalfa meal, beet pulp, rice bran, flaxseed, soybean meal) and are often the very same ingredients owners reach for when formulating a ration themselves. The meaningful difference is essential nutrient fortification, not raw ingredients. A quality commercial feed is formulated to correct the deficiencies and imbalances inherent in individual ingredients. Replicating that same precision at home with a patchwork of individual ingredients and supplements is genuinely difficult, even for attentive, well-intentioned owners. The practical reality is that balancing multiple interacting nutrients without a feed formulation background is much more difficult than selecting a quality commercial feed product that is appropriate for the individual horse, whether that is a ration balancer, concentrate, or complete feed.

Key takeaway*: Help owners understand that "avoiding commercial feed" does not automatically mean a healthier diet, and home-mixed rations are more likely to contain nutrient deficiencies and/or imbalances. If an owner chooses to take this route, the ration should be evaluated against current NRC requirements by a qualified equine nutritionist and not assumed superior simply because it is "natural."*

9:10 - 10:10am

Integrating Equine Joint Supplementation into Lameness Management and Athletic Performance Preservation (Sponsored by Slide Joint Care)

Ron Riegel, DVM

Lameness is a leading cause of reduced performance, lost training days, and premature retirement in equine athletes. Conventional management strategies—including diagnostic imaging, intra-articular therapies, and pharmacologic anti-inflammatory intervention—remain essential but are often directed toward managing clinical signs rather than preserving long-term joint health and athletic durability. As expectations for sustained performance increase, veterinarians are increasingly tasked with implementing proactive strategies that support tissue integrity, recovery, and functional longevity.

Equine joint supplementation has emerged as a complementary tool within comprehensive lameness and performance management programs. Key nutraceutical components, including hyaluronic acid, Type II collagen, and hydrolyzed collagen, play distinct yet synergistic roles in maintaining synovial fluid quality, supporting cartilage and connective tissue matrix integrity, facilitating tissue remodeling, and modulating low-grade inflammation associated with repetitive athletic load. When integrated appropriately, joint supplementation may enhance joint homeostasis, improve movement efficiency, and support consistent performance while potentially reducing reliance on continuous pharmacologic intervention.

This continuing education presentation reviews the pathophysiology of joint degeneration and performance decline, examines the mechanistic and evidence-based rationale for targeted joint supplementation, and discusses practical clinical considerations for incorporation into veterinarian-directed lameness management plans. Emphasis is placed on transitioning joint supplementation from a reactive, symptomatic approach to a proactive strategy aimed at preserving soundness and sustaining athletic performance throughout the competitive career of the equine athlete.

Learning Objectives

At the conclusion of this presentation, participants will be able to:

1. Describe the relationship between joint pathophysiology, repetitive athletic load, and performance decline in equine athletes.
2. Explain the mechanisms by which hyaluronic acid, Type II collagen, and hydrolyzed collagen support joint and connective tissue health.
3. Identify appropriate clinical scenarios for integrating joint supplementation into lameness management and performance preservation strategies.
4. Apply a proactive, veterinarian-guided framework for using joint supplementation to support long-term soundness and athletic longevity.

9:10 - 10:10am

Equine Eye Emergencies: What can be done in the field?

Nikki Scherrer, DMV, DACVO

Equine Recurrent Uveitis

Uveitis is the leading cause of blindness in horses worldwide. Although uveitis can be caused by trauma and infectious disease it is best known in horses due to equine recurrent uveitis (ERU). ERU is generally considered an immune-mediated disease with a reported prevalence of 2-25%.[1-3] Episodes of uveitis continue to occur when Cd4 + T lymphocytes are up regulated and the immune system responds to what is recognized as new antigens.[4] Clinical signs of uveitis result when there is a breakdown of the blood aqueous barrier (BAB). The endothelium of the iris blood vessels and the nonpigmented layer of the ciliary epithelium form the blood aqueous barrier. When inflammation occurs, the barrier becomes permeable and plasma proteins enter the aqueous.[1]

Clinical signs of uveitis are variable. Anterior uveitis is more recognizable and more commonly seen with epiphora, blepharospasm, circumlimbal vascularization, corneal edema, keratic precipitates, aqueous flare, miosis, corpora nigra atrophy, iris hyperpigmentation, synechiae and cataracts. Equine cataracts are most commonly secondary to uveitis. All cataracts have the possibility of progression; cataract characteristics can help determine the likelihood of progression. Cataracts can be classified according to etiology (primary, secondary), age of onset (developmental, senile), stage of maturity (incipient, immature, mature, hypermature), and location.[4] Cataracts due to uveitis are most commonly seen in the anterior cortex. If posterior synechiae are present then associated cataracts can develop on the anterior capsule. The equator is the most metabolically active portion of the lens so cataracts in this location tend to be progressive, especially if vacuolation is also seen.[5] Other complications associated with uveitis include glaucoma and retinal detachment. Both complications can result in permanent blindness.

The goals of treatment are to reduce discomfort and inflammation.[1] Initial episodes of uveitis are commonly managed with medical therapy consisting of topical and systemic anti-inflammatories. Long-term treatment options include cyclosporine suprachoroidal implants and intravitreal gentamicin injections. Long-term follow-up of suprachoroidal cyclosporine implants reports vision in 78.8% of cases. Complications directly associated with the implant are uncommon, however, persistent uveitis is reported to be seen in 54% of cases with less frequent episodes than seen preoperatively.[6] Intravitreal gentamicin injections have reported control of ERU in the short-term (86.4-88.1%).[7-9] Post-injection complications consisted of cataract formation/maturation (8.5%) and diffuse retinal degeneration (5.1%).[7] A more recent study including cases of heterochromic iridocyclitis with secondary keratitis (HIK) treated with intravitreal gentamicin injection had poorer success (41%) with a higher incidence of complications suspected to be associated with the injection including cataract formation/maturation (16%) and diffuse retinal degeneration (22%).[9]

For horses that are permanently blind and remain painful there are two options for comfort: chemical ablation and eye removal. Chemical ablation involves an intravitreal injection of a substance toxic to the intraocular tissues and it is used in cases of glaucoma with uncontrolled intraocular pressure. The author commonly uses 40 mg gentamicin and 1 mg dexamethasone. It is not successful in all cases and phthisis bulbi is possible. Enucleation can be performed standing in most cases.

Ulcerative Keratitis

An uncomplicated ulcer has been present for less than a week and has no stromal loss or cellular infiltrate.[10] Uncomplicated ulcers ALWAYS involve only the superficial epithelial layer. Reepithelialization occurs at a rate of 0.6mm/day. To prevent infection uncomplicated ulcers should be treated with a broad spectrum antimicrobial such as Neomycin Polymyxin Bacitracin.

Complicated ulcers are defined as an ulcer that does not heal in an appropriate time frame (5-7 days). Complicated ulcers fall into one of three categories: infectious, mechanical, or nonhealing. To help you decide what category an ulcer falls into cytology, PCR and/or culture can be perfromed. If neutrophils, fungal hyphae, or intracellular bacteria are seen infectious disease is suspected. The presence of eosinophils suggests eosinophilic keratitis.

A nonhealing ulcer is suspected if the ulcer is superficial, has loose epithelial edges, and usually there are few corneal vessels. Cytology must be unremarkable with only normal epithelial cells. Without intervention the ulcers can remain for weeks to months. Treatment involves a combination of debridement and topical medications to prevent infection. Debridement options include cotton tip debridement, diamond burr keratotomy, grid keratotomy, and superficial keratectomy. In general, a cotton tip debridement is a good starting place for nonhealing ulcers but only 63% treated with debridement alone healed in contrast to diamond burr keratotomy (92%), grid keratotomy (80%), and superficial keratectomy (100%).[10] The average age of horses with nonhealing ulcers treated with a diamond burr debridement was 14.68 years. The horses that healed (92%) did so over an average of 15.5 days.[11]

Infectious keratitis is diagnosed based on stromal loss, corneal infiltrate, and ocular pain (epiphora and blepharospasm). If corneal disease is severe it can cause a reflex uveitis resulting in aqueous flare and miosis. PCR and/or culture can be used to determine what infectious organism is the causative agent. Infection of corneal ulceration in horses is very common due to their environment and their commensal bacteria and fungi present on the ocular surface. Many organisms have been reported but Staphylococcus (44%), Streptococcus (24%) and Pseudomonas (14%) are the most common isolates.[12] Corneal melting can occur due to the overproduction of proteases that cause corneal deterioration and globe instability. The proteases often identified in equine keratomalacia are matrix metalloproteinases 2 and 9. Topical steroids can delay epithelialization and vascularization as well as reduce normal ocular immunity. [13,14]

Fungal keratitis is common in our equine patients. The incidence of fungal keratitis is influenced by geography with fungal infections being seen often in the warm, humid climates (mid-atlantic and southeastern areas) and less common in the western United States. Aspergillus and Fusarium are the most common fungal organisms isolated in cases of keratomycosis.[15] Fungal keratitis is often characterized by a yellow plaque or ulcer with “cake-frosting” appearance. The ulcerative area can be surrounded by a region of stromal loss or furrowing.[16,17]

In our equine patients, treatment for infectious keratitis includes an antimicrobial, antifungal, anticollagenase, atropine, and a systemic anti-inflammatory. In general, it is easy to administer solutions through a subpalpebral lavage. If topical medications can be easily applied, ointments should be used as they have a longer contact time than solutions. Broad spectrum coverage can be achieved by fluoroquinolones, chloramphenicol, neomycin polymyxin bacitracin and oxytetracycline. Cefazolin is an antimicrobial that has a gram-positive cocci specific coverage. Gentamicin and tobramycin both have gram negative specific coverage. Azoles target the fungal specific enzyme in the cytochrome P450 system. This inhibits ergosterol synthesis and increases membrane permeability.[18] In most areas voriconazole is the most effective anti-fungal and should be used only for therapeutic purposes.[19] DMSO/Itraconazole is also an effective antifungal that can be used for prophylactic and therapeutic treatment. Itraconazole can also be given orally although in non-inflamed eyes, concentrations were not detected in the aqueous.

Anticollagenases help to prevent keratomalacia in the presence of infectious keratitis. Serum is inexpensive but has the potential for contamination if not stored properly. EDTA is an anticollagenase that can be compounded as a solution or ointment. A mydriatic is applied to provide cycloplegia (paralysis of the ciliary muscle) and

improve ocular comfort. Pupil dilation will also reduce the chance of posterior synechiae which can result in dyscoria (change in pupil shape) long-term. Atropine also helps to stabilize the blood-aqueous barrier which can help manage reflex uveitis. The frequency of atropine should be minimized due to the risk of systemic absorption and gastrointestinal signs.[20] The systemic anti-inflammatory used most often is an nonsteroidal anti-inflammatory. Systemic NSAIDs are used to help manage ocular pain and inflammation. They should be used only as needed due to renal and gastrointestinal side effects associated with their use.

In many cases of infectious keratitis, surgical stabilization is warranted. Surgical intervention is recommended when stromal loss is >50%, the pupil remains closed, or ocular pain cannot be managed. A keratectomy is performed to reduce the amount of infectious organisms and stabilize the cornea. To provide structural support to the area, a graft can be applied. Options include amnion, extracellular matrix (Acell, Biosys), and conjunctiva.[21-23] When corneal vascularization is too far from the ulcerated area a conjunctival graft should be used as it will provide a direct blood supply. The negative side of the conjunctival graft is that it will be a permanent scar. Amnion and the extracellular matrix grafts will be incorporated into the cornea and result in a more cosmetic appearance.

Immune-Mediated Keratitis

Immune-mediated keratitis (IMMK) is a nonulcerative keratitis characterized by corneal opacity, vascularization, lack of uveitis, and lack of ocular pain. Immune mediated keratitis can be classified based on depth of the lesion within the cornea: epithelial, stromal, and endothelial. The exact pathogenesis is unknown but an immune driven response is suspected. Treatment is based around topical immunosuppressives or immunomodulators such as steroids, nonsteroidals, cyclosporine and tacrolimus. Medical treatment has variable success in the literature.[24,25] Since this is a recurrent disease, topical medications are lifelong. Surgical keratectomy has an excellent rate of disease resolution. Endothelial IMMK results in severe corneal edema that can be rapidly progressive. This form of IMMK is often refractory to medical treatment. Surgical treatment with a conjunctival inlay flap can halt the progression of corneal edema.[26]

Stromal Abscess

The majority of stromal abscesses that were cultured at surgery were fungal (47% fungal vs 2% bacterial).[27] However, many stromal abscesses are successfully treated medically and the etiology of these is not known. Medical intervention includes frequent application of antimicrobial and antifungal medications that can penetrate an intact epithelium such as fluoroquinolones and voriconazole. Intrastromal voriconazole injections can help reduce overall healing time by depositing high concentrations around the abscess.[28,29] If the abscess is causing severe uveitis or ocular pain, surgical intervention is recommended. A posterior lamellar keratoplasty (PLK) can be performed to salvage the normal cornea while replacing the abnormal cornea with a graft. The success rate is 98% with an average treatment time of 31 days.[30]

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10:45 - 11:45am
Closing the Treatment Gap: Optimizing Early Intervention in Equine DJD
(Sponsored by American Regent Animal Health)
Kyla Ortved, DVM, PhD, DACVS, DACVSMR

Lecture notes were not provided for this session.

10:45 - 11:45am
Equine Dentistry Is Equine Medicine: Best Done by the Veterinarian

James Casey, D.V.M., M.S.

(PART 1)

I. History of veterinary medicine and dentistry

a. Closely tied to the development of human medicine & the first veterinarians were horse doctors.
b. Rudimentary medical skills are thought to have existed as early as 9000 BC.
c. The first veterinary school was founded in Lyons France in 1761, later known as the Royal Veterinary School
d. A major part of veterinary study early on, was concentrated on the horse.
e. During the American Revolutionary War, General George Washington, took great strides to recruit those that had veterinary training for the war effort.
f. The first veterinary schools in the United States were established in the 1850's.

II. Practice of Equine Dentistry requires considerable skill, knowledge, and expertise.

a. Veterinarians must be proficient in medicine, surgery, and dentistry
b. Be well versed in areas such as pediatrics, obstetrics, anesthesiology, plastic surgery, dermatology, radiology, geriatrics, and orthopedics.
c. Veterinarians must deduce problems without sharing a single spoken work with the patient.
d. Veterinarians must be acute diagnosticians with top notch powers of observation and intuition.
e. One must excel in advanced mathematics (calculus and statistics), biology (microbiology, vertebrate biology, etc..), chemistry (organic & biochemistry), physics, and animal husbandry, etc.
f. Veterinarians further educate themselves in dentistry through continuing education lectures, wet labs, and in-depth seminars taught by leaders in the field.
g. The trained veterinary dentist has received the most up-to-date information and education so they may perform excellent equine dentistry and care for the horse's mouth.

III. Differences in horse's teeth, problems indicating dental issues, common abnormalities.

a. Humans, cats, and dogs have Brachydont (short crowned) teeth.
b. Horses have Hypsodont (long tall crowned) teeth and are approximately 4 inches long, with only a small portion above the gum line.
c. Horse's teeth erupt or are pushed outward from their base about 3 millimeters a year for most of their life.
d. Horse's teeth are worn down (wear) as they are used to grind, masticate, and process grass, hay, & today other food IV.

IV. Veterinarian Participants will learn about the inadequacies of Laypeople (tooth floaters) practicing dentistry on horses, why Equine Dentistry is Veterinary Medicine and best left in the hands of the Licensed Veterinarian.

a. Only a veterinarian has the medical knowledge to understand and treat a dental condition that may affect the horse's overall health.
b. Most equine dental procedures, including basic floating, irreversibly change the horse's teeth and therefore are most appropriately performed by a veterinarian.
c. Equine dentistry is an important branch of veterinary medicine which should only be performed by a licensed veterinarian.

(PART 2)

I. Triadan numbering system of equine teeth.

II. How to know if the horse has a dental problem?

a. Horses with dental problems may show obvious signs such as pain or irritation, or they may show no noticeable signs at all.

b. Equine veterinarians skilled in dentistry are constantly amazed at how much discomfort horses will endure without any overt signals to their owners.

c. By the time the average owner notices a problem, such as loss of feed from the mouth while eating, fighting the bit or foul odor from the mouth or nostrils, the abnormalities inside the mouth are likely to be severe.

III. Proper Equine Dental Care's role in colic prevention

IV. Let's Talk About Wolf Teeth: is it always necessary to extract?

a. Wolf teeth are the remnants of the first premolars that have now become obsolete with the evolution of the horse.

b. The most common first premolars seen in the horse are the uppers and they are shaped similar to small canine teeth.

c. This is why they are often described as wolf teeth. These sharp teeth, if present, are in the area of the mouth where the bit fits.

d. Wolf teeth may cause the horse some discomfort when pressure is placed on the bit. Therefore, these teeth are usually removed in young riding horses.

e. However simply floating the Wolf teeth often solves this problem.

V. Secondary Sinusitis due to Dental Disease

VI. Eruption Pseudocysts: Understanding of eruption time of deciduous teeth and permanent dentition

a. Understanding of eruption times of deciduous and permanent dentition should be second nature to veterinarians working in the equine mouth. The shedding of deciduous teeth is an entirely natural process that generally does not require human intervention to proceed normally. With all natural occurrences, sometimes things don't go as planned. Some veterinary intervention could be required to put the young horse's mouth on track for a healthy life. Generally, it's OK to extract loose deciduous teeth.

VII. Hand floating versus Powered Instrument Floating of teeth including cautionary measures.

a. Traditionally, horses have had their sharp enamel points and dental crown elongations reduced with hand-held rasps (floats).

b. These manual dental instruments have improved in quality over the past 20 years but still require a reasonable amount of manual dexterity, physical strength and "elbow grease."

c. High quality dental tools powered by electricity or compressed air have become readily available and affordable over the past 20 years. These instruments reduce the physical effort that is required, and with expertise and caution, allow for more complete and efficient dental care.

VIII. Standing Oral Extraction Equine

IX. Odontoclastic Tooth Resorption and Hypercementosis (EOTRH).

X. Tongue Injuries

XI. Practice tips for Equine Dental Sedation and Anesthesia

a. Some horses find the process of having their mouth opened and instruments placed in the oral cavity to be stressful.
b. For a complete oral examination and good quality corrective care, most horses benefit from a mild sedative to relieve any stress or unnecessary movement on the patient's part.
c. This should be done when indicated and needed.
d. An array of medications is available to assist us when we perform dentistry.
e. These medications make the horse more comfortable.
f. When the horse is sedated, it allows us to do a better job in a safer way.

XII. Advances in Equine Medicine will be discussed and What to look for in a good Equine Veterinarian doing Dentistry.

a. They should be using portable surgical grade light (not a flashlight), a padded stand, a full mouth speculum, and a veterinary assistant to steady the horse's head.
b. All equine dental procedures are best performed when you can see what you are doing. This work does not need to be done blindly.
c. Again, when the horse is sedated, it allows us to do a better job in a safer way.
d. All dental instruments, the speculum (device that holds the horse's mouth open), buckets, etc. are all cleaned and washed with an antimicrobial disinfectant (I use Nolvasan Scrub and Solution) between each and every horse. No exceptions!
e. They should be well equipped with good instrumentation, both motorized and non-motorized.
f. A complete examination with the use of surgical grade lighting, a dental mirror, and other appropriate instruments should be done.
g. A record indicating all teeth in your horse's mouth, noting location and significance of all abnormalities, what work needs to be done, and time of follow up examinations should also be included.
h. They should have access to diagnostic imaging equipment such as x-rays, preferably digital x-rays.
i. This allows us to uncover and manage a host of equine dental abnormalities.
j. When any invasive procedure such as wolf teeth extraction is performed, it should be done with sterile instruments under sterile techniques.

11:50 - 12:50pm

From Barn To Record: Using AI to Reclaim Time and Stay Fully Present in Your Equine Practice (Sponsored by Talkatoo)

Shawn Wilkie, CEO/Founder of Talkatoo

The presentation, "From Barn to Record," addresses the challenge of documentation burden for equine veterinarians and proposes a solution using Talkatoo. The core argument is that while vets entered the profession for the barn, the animals, and client relationships, they often face an "Invisible Second Shift" of paperwork, finishing notes hours after farm visits.1

The Problem of Documentation and Burnout

This after-hours documentation leads to missed details, incomplete records, mental fatigue, and the loss of family and recovery time. The burden of documentation is identified as a leading driver of veterinary burnout. Incomplete or undone records carry significant risk, including compliance gaps that endanger a license, missed clinical details affecting patient care, and chronic exhaustion that can lead to professionals exiting the field.

Talkatoo as the Solution

AI is now integrated into veterinary practice to handle time-draining tasks that do not add clinical value. Purpose-built veterinary AI is distinct from general voice-to-text tools because it understands clinical terminology, breed names, drug names, and the shorthand used by experienced equine vets.

Talkatoo captures spoken exam findings in the barn, field, or at the trailer, instantly converting them into structured, accurate medical records. The vet can stay focused on the horse while Talkatoo documents the visit.

Application in the Field

The tool is designed for how equine vets actually work, offering solutions for various scenarios:

- **Farm Call:** The vet speaks findings during a lameness exam or work-up, and the record is complete before they get back to the truck.
- **Emergency Call:** During a critical patient situation, such as a 3am colic, the vet narrates observations, ensuring no detail is lost even when both hands are occupied.
- **Wellness Day:** When seeing multiple horses back-to-back, each record remains distinct, complete, and finished before leaving the property.
- **Windshield Time:** Callbacks made through the Talkatoo app are instantly summarized and added to the communication log.

Reclaimed Time and Key Features

Across more than 30,000 veterinary professionals, Talkatoo users consistently reclaim an average of 10 extra hours a week from documentation. This reclaimed time can be used to see more patients, leave the barn on time, or rest and spend time with family.

The presentation highlights three core features demonstrated:

- **Auto-Records:** Produces detailed, structured SOAP notes in real time using the mobile or desktop app to record entire appointments.
- **Auto Follow-Up:** Automatically generates, executes, and tracks post-appointment care to ensure consistent, timely client communication.
- **Call Summary:** Allows calls to be made through the app using the clinic's number while keeping the vet's personal number private; the AI summarizes the conversation and provides a detailed note, transcript, and recording.

The presentation concludes that lifting the administrative weight allows the vet to be fully present, finish the last appointment with records done, and enhance the focus and care felt by clients.

11:50 - 12:50pm
Keeping Burnout at Bay
(Sponsored by Decade One)
Amy Grice, VMD, MBA

Burnout has been recognized for many years as an occupational hazard for various people-oriented professions, such as human services, education, and health care. This session will review the reasons equine veterinarians are particularly at risk, and discuss changes needed to support mental health.

Program Agenda:

1. Explore current statistics and facts outlining burnout in workers across the globe as well as in veterinary medicine
2. Review key dimensions of burnout, including overwhelming exhaustion, feelings of cynicism and detachment from the job, and a sense of ineffectiveness and lack of accomplishment.
3. Discuss factors that influence employee burnout, including unfair treatment at work, an unmanageable workload, unclear communication from managers, lack of manager support, and unreasonable time pressure
4. Discuss way to address the causes of burnout related to practice life as an equine veterinarian

Learning Objectives:

- Understand how burnout affects people across the world as well as equine practitioners
- Gain a clear picture of the factors that influence employee burnout
- Explore ways to establish new paradigms to minimize burnout as an equine veterinarian

I adhere to Conflict-of-Interest guidelines in the RACE Standards at the time of application submission.
Date of application: February 2026

2:50 - 3:50 pm
From Starved to Stable: Best-Feeding Practice Nutrition for Refeeding and Managing the Equine Hard Keeper

(Sponsored by Triple Crown Nutrition)

Carey Williams, Ph.D.

Introduction

Neglect and malnutrition remain clinically relevant issues in equine practice, often associated with economic hardship, lack of nutritional knowledge, or inadequate management. Emaciated horses frequently present with multisystem compromise requiring coordinated medical and nutritional intervention. Veterinarians play a central role in diagnosing underlying disease and identifying metabolic risks, particularly refeeding syndrome, whereas nutritionists develop progressive feeding plans to support gastrointestinal recovery and safe caloric reintroduction (Stull, 2012).

Recent retrospective case analyses further emphasize that initial clinical presentation is strongly associated with outcome; horses presenting with lower body condition scores (BCS) and elevated inflammatory indicators are significantly less likely to survive the first 100 days of rehabilitation (Schneider et al., 2021). These findings reinforce the importance of early assessment and evidence-based intervention strategies. In addition, starvation induces widespread metabolic dysfunction, including disruptions in energy metabolism, electrolyte balance, and organ function, which must be considered when developing refeeding protocols (Main et al., 2022).

The goal of this paper is to summarize evidence-based refeeding approaches and provide practical nutritional strategies for rehabilitating emaciated and hard-keeping horses.

Assessing the Starved Horse

Initial examination should include body condition scoring, with BCS ≤2 indicating critical emaciation. Evaluation of hydration status, vital parameters, dental condition, and fecal quality is essential. Baseline diagnostics should include complete blood count and serum chemistry, with emphasis on phosphorus, potassium, magnesium, and glucose concentrations to assess refeeding risk (Stull, 2012).

Body condition score is not only a descriptive assessment tool but also a clinically relevant prognostic indicator. Survival probability has been shown to increase markedly with each unit increase in BCS, supporting its use in triage and decision-making during rehabilitation (Schneider et al., 2021). In addition to physical evaluation, laboratory findings may reveal altered immune status, hypoalbuminemia, and metabolic disturbances consistent with chronic malnutrition.

Refeeding syndrome occurs when insulin release following carbohydrate intake induces intracellular shifts of phosphorus, potassium, and magnesium, resulting in potentially fatal hypophosphatemia (Stull and Witham, 1998). This condition is more likely in horses with prolonged anorexia, severe muscle wasting, or pre-existing electrolyte abnormalities.

Evidence-Based Refeeding Protocol

Phase 1 (Days 1–5): Stabilization

- Feed high-quality alfalfa only, approximately 1 lb every 4 hours
- Avoid concentrates entirely during the first 14 days
- Monitor vital signs and electrolytes closely

Alfalfa is recommended due to its protein and calcium profile and its ability to produce less pronounced insulin responses compared to concentrates (Stull and Witham, 1998). Frequent small meals help stabilize metabolism during early refeeding.

Phase 2 (Days 6–14): Controlled Caloric Increase

- Increase alfalfa to 2–4 lb per feeding
- Gradually decrease feeding frequency as tolerated
- Continue forage-only diet and monitor clinical response

Maintaining a forage-based diet minimizes starch intake and supports safe metabolic adaptation. This gradual increase in caloric intake helps prevent metabolic disturbances associated with refeeding syndrome (Stull, 2012).

Phase 3 (Weeks 3–12+): Weight Restoration

- Transition to free-choice forage
- Introduce concentrates no earlier than Day 14
- Start at 0.5 lb twice daily and increase gradually

Appropriate concentrate options include low non-structural carbohydrate (NSC) senior feeds or ration balancers. Supplemental fat sources may be introduced once forage intake is stable. Full recovery may require 3–5 months depending on severity (KER, 2020).
Progressive refeeding not only restores body weight but also drives significant improvements in metabolic function. As nutritional intake increases, metabolic profiles shift from states of negative energy balance and tissue catabolism toward restoration of normal energy metabolism, organ function, and tissue repair (Main et al., 2022).

Monitoring and Complications

Refeeding syndrome may present clinically as weakness, tachycardia, edema, and neurologic abnormalities. Treatment includes electrolyte supplementation, fluid therapy, and temporary reduction in caloric intake (Stull, 2012).

Hematologic and biochemical monitoring provides valuable insight into clinical progression. Increased white blood cell counts have been associated with poorer survival outcomes and may reflect underlying inflammation or infection in severely compromised horses (Schneider et al., 2021). Additionally, parameters such as albumin, creatinine, and non-esterified fatty acids can reflect nutritional status and metabolic recovery, as these biomarkers typically normalize with successful refeeding (Main et al., 2022).

Digestive complications can be minimized through gradual dietary transitions and consistent forage intake. Behavioral issues, including food aggression, may also develop and require structured feeding management.

Feeding the Hard Keeper

Thin horses should be evaluated for underlying causes including parasitism, dental disease, PPID, gastric ulceration, and chronic stress. Nutritional management should prioritize high-quality, free-choice forage, inclusion of alfalfa for caloric density, and the use of high-fat, moderate-starch concentrates.

From a physiological perspective, chronically thin or malnourished horses often exhibit increased reliance on lipid mobilization and muscle catabolism to meet energy demands. These adaptations may impair immune function, reduce performance, and complicate recovery if not addressed through appropriate nutritional intervention (Main et al., 2022).

Additional energy sources such as rice bran and vegetable oils may be incorporated. Supportive therapies, including probiotics, ulcer management, and stress reduction, may further improve digestive efficiency and weight gain.

Management considerations include minimizing feed competition, adjusting herd dynamics, and providing blanketing in cold weather to reduce energy expenditure.

Take-Home Points

- A forage-first, alfalfa-based refeeding strategy remains the safest initial approach
- Concentrates should be avoided for at least the first 14 days
- Careful monitoring of electrolytes is essential to prevent refeeding syndrome
- Body condition score at presentation is a key prognostic indicator
- Underlying causes of weight loss must be addressed in hard-keeping horses
- Collaboration between veterinarians and nutritionists improves clinical outcomes

References and Additional Resources

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2:50 - 3:50 pm

Rehabilitation and Shoeing Strategies for Tendons & Ligament Injuries in Horses

Kara Anne Brown, VMD, DACVSMR

Key Concepts in Tendon and Ligament Injury

- Equine tendons and ligaments are predisposed to injury due to the horse's unique anatomy, with muscle mass concentrated proximally and long distal tendons/ligaments
- Healing occurs in three phases:
    - **Inflammation (3–5 days):** vascular response, debridement, scaffold formation
    - **Repair (3 days–2 weeks):** extracellular matrix synthesis
    - **Remodeling (2 weeks–1 year):** replacement of inferior tissue with more organized tissue
- Tendon healing is challenging because:
    - Collagen turnover is slow
    - Repair tissue (collagen type III) is stiffer and less elastic
    - Injured tendon/ligament regains only ~80% of original tensile strength at one year
    - Tendons within tendon sheaths have altered blood supply and impaired healing potential

Structuring a Rehabilitation Program

General Rehabilitation Goals

- Decrease inflammation and pain
- Improve quality of healing
- Reduce scar tissue formation
- Maintain overall strength and fitness

Controlled Exercise

- Improve collagen orientation
- Encourage appropriate tissue adaptation
- Prevent excessive strain on healing tissue

Core Strengthening

Core strengthening (dynamic mobilization exercises, sternal lifts, pelvic tucks, elastic resistance bands) is an important adjunct to rehabilitation programs, particularly in equine athletes.

- Maintains musculature during rest
- Improves postural stability
- May reduce re-injury risk
- Improves symmetry in lame horses

Physical Modalities

- Cryotherapy (for acute inflammation and pain reduction)
- Heat Therapy (chronic tendon and ligament injuries, increasing tissue extensibility, increased blood flow)

Electrophysical Therapies

- Extracorporeal Shockwave Therapy (ESWT)
    - Mechanical microtrauma stimulates healing
    - Increased blood flow and neovascularization
    - Pain reduction through decreased nerve signaling
- Laser Therapy
    - Photobiomodulation
    - Increased ATP and oxygen production
    - Enhanced cellular metabolism
- Electromagnetic Therapies (PEMF/SMFT)
    - May reduce inflammatory mediator production
    - Evidence remains limited and somewhat conflicting

Shoeing Strategies for Tendon and Ligament Injuries

- Breakover modifications (move breakover point palmarly/plantarly to decrease strain on deep digital flexor tendon (DDFT) and inferior check ligament)
    - Rolled or rockered toe
- Raising angle will decrease strain on DDFT and inferior check ligament, and increase strain on superficial digital flexor tendon (SDFT) and suspensory ligament
    - Wedge or bar shoe (raises angle in soft footing)

- Lowering angle will increase strain on DDFT and inferior check ligament, and decrease strain on SDFT and suspensory ligament
    - Shoe with narrow bar and wide toe

Farrier Collaboration

- Provide diagnostic imaging
- Clearly communicate diagnosis
- Focus on biomechanical goals rather than rigid prescriptions
- Maintain realistic owner expectations
- Recognize that shoeing responses are highly individual and may take time

Conclusion

Successful management of tendon and ligament injuries requires an individualized, multimodal approach that combines progressive controlled exercise, thoughtful use of rehabilitation modalities, and biomechanically appropriate farriery. Careful reassessment throughout rehabilitation is critical to optimize healing, minimize re-injury risk, and support safe return to athletic function.

3:55 - 4:55pm

One Wrong Step: Diagnosis and Management of Penetrating Foot Wounds in the Horse

James Orsini, DMV, Dipl. ACVS

Alex Scharf, DVM, PhD, Dipl. ACVR, Dipl. ACVR-EDI

Understanding the Clinical Anatomy of the Foot

Penetrating wounds of the equine foot can have serious consequences because of the close proximity of vital synovial and osseous structures. The principal structures at risk include the distal interphalangeal joint (DIPJ), navicular bursa, deep digital flexor tendon (DDFT), distal phalanx (P3), navicular bone, and associated ligaments, tendons, neurovascular structures, and digital flexor tendon sheath. There are no clinically significant differences between the fore and hind feet relevant to the diagnosis and management of penetrating injuries.

The distal phalanx (P3) is enclosed within the hoof capsule and forms the structural foundation of the foot. Its solar surface is mildly concave and is supported by the digital cushion, which contributes to shock absorption during weight bearing. The flexor surface of P3 serves as the insertion site of the DDFT and impar ligament. The collateral cartilages arise from the palmar/plantar processes of P3 and extend proximally to the level of the coronary band. The proximal aspect of P3 contributes to the DIPJ and the extensor process provides the enthesis for the common (long) digital extensor tendon.

The distal interphalangeal joint is a composite synovial articulation formed by the distal middle phalanx (P2), proximal P3, and the dorsal navicular bone. Although primarily a hinge joint permitting flexion and extension, limited rotational and lateral motion is possible.

The DDFT descends through the pastern and courses over the palmar/plantar aspect of the navicular bone before inserting broadly on the flexor surface of P3. Between the DDFT and the navicular bone lies the navicular bursa, a synovial structure that is commonly involved in penetrating solar injuries.

The navicular bone functions as a fulcrum for the DDFT and is stabilized by proximal suspensory (collateral) ligaments and distally by the impar ligament, which also attaches to the flexor surface of P3. Because of its intimate

relationship with the DDFT and navicular bursa, penetrating wounds entering the frog or central sulcus can readily involve one or more of these structures.

A practical understanding of this anatomy is essential when evaluating puncture wounds, as the location and trajectory of penetration determine the structures at risk and the urgency of intervention.

Imaging Techniques Used in Evaluation of the Foot

Digital Radiography

Digital radiography remains the initial imaging modality for most penetrating foot wounds. It is widely available, cost-effective, and useful for identifying radiopaque foreign bodies, fractures, gas tracts, osteomyelitis, and evidence of synovial involvement. Standard projections should be supplemented with additional views based on the suspected trajectory of penetration. When possible, radiographs should be obtained with the penetrating object left in place to aid assessment of its direction and depth.

Computed Tomography (CT)

Computed tomography provides cross-sectional imaging without superimposition and is particularly valuable for evaluating the complex anatomy of the equine foot. CT is considered the gold standard for osseous imaging and offers superior detection of fractures, sequestra, cortical defects, and osseous infection compared with radiography. In addition, CT can help define the path of penetrating injuries and identify retained foreign material that may not be visible radiographically.

Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging is the gold standard for evaluating soft tissue structures within the hoof capsule. MRI provides excellent visualization of the DDFT, navicular bursa, collateral ligaments, digital cushion, and other soft tissue structures commonly affected by penetrating injuries. Both low-field and high-field systems are used in equine practice, with high-field systems providing superior image quality. Standing low-field MRI has expanded access to advanced imaging of the equine foot while avoiding general anesthesia in many cases.

Clinical Application

Successful management of penetrating foot wounds depends on early recognition of potentially affected synovial structures, which is guided by diagnostic imaging. Radiography is typically the first-line modality, while CT and MRI provide complementary information and can improve prognostication when the extent of injury, synovial involvement, or soft tissue damage cannot be fully characterized using conventional radiographs alone.

3:55 - 4:55pm

From Head to Hoof: Distinguishing the Neurologic Horse From the Lame Horse

Sarah Colmer, VMD, DACVIM-LAIM

Introduction o **Definitions**

Ataxia**:** incoordination; abnormal gait due to neurologic dysfunction

Lameness**:** limping; abnormal gait due to musculoskeletal dysfunction

o **Where to start?**

Consider the most severe abnormality

Consider the goals of the client on that particular day – which is most important to them?

- **Historical elements of importance**

Description, duration, interventions attempted

Does the owner perceive pain? Important question to ask!

Is the problem predictable?

Behavioral component?

Pain vs brain vs learned
Pain: orthopedic, muscular/myopathic, tack fit, etc • Brain: Neurodegenerative disease (eNAD/EDM)?
Other: Ophthalmologic

- **The examination(s)**

§ The beginning: walk and trot in a straight line

Ataxia is often best seen at a walk o Irregularly irregular (typically)

Lameness is often best seen at a trot o Regularly irregular (typically)

NOTE: The cervical myelopathic horse may have a particularly "bouncy" trot due to increased tone

Review: upper vs lower motor neuron

Upper motor neuron	**Lower motor neuron**
Long stride	Short stride
Floating	Choppy
Spastic/"bouncy"	Weak
	Muscle atrophy

Some notes on specific maneuvers

Serpentines: opportunity to assess for toe-dragging, circumduction, delayed protraction, assessment of stride length

Head elevation: removes horizon, calls on horse to rely on proprioception & can worsen deficits for any reason, but note that changing neck position and could anatomically result in exacerbation of certain conditions, ie CVSM; possibility of causing pain i.e. some neck diseases o Ask yourself: does it change the horse's gait? Does it make them reluctant?

Tail pull: assess the ease with which the horse can be pulled offtrack in either direction and pay attention to overshooting return to track, if there is asymmetry on one side vs the other and if they interfere with their own limbs. Do not judge the first pull – horse is not expecting.

The combination lame and ataxic horse:

Is there a significant enough lameness that it will inhibit your ability to assess foot placement for the remainder of the neurological evaluation?

If so: consider diagnostic analgesia and then REPEAT neurological evaluation after horse blocks out

Consider anti-inflammatory trial and re-evaluation

Can help discern MSK vs neuro

Consider re-evaluating on a different day

Remember that myopathies can influence performance, lameness, gait

- **The lunged, ridden or weighted exam**

Lunged, ridden or surcingle (+/- weighted surcingle)

- More often used for lameness or behavior than explicit ataxia concerns

- **Summarize findings**

Neurologically normal or abnormal?

In how many limbs is the horse abnormal?

Type of ataxia?

Upper or lower motor neuron?

If spinal ataxia, what grade?

Modified Mayhew ataxia scale

Neurolocalization? *The "big 3" - chart courtesy of Dr Amy Johnson*

Then formulate ddx and diagnostic plan

Remember: common things happen commonly

	CVSM	EPM	EDM
Chronic tripping or stumbling	*		*
Rapid worsening	*	**	
Improvement with NSAIDs	*		
Improvement with steroids	*	*	
Improvement with rest	*	(worse)	(worse)
Neck pain/stiffness	*		
Thoracic limb lameness	**	*	
Pelvic limb lameness		**	
Dullness or depression		*	*
Bad or unpredictable behavior	*		**