The Lameness Evaluation

Rachel Fishman

Clinicopathologic Conference

May 20, 2016

Advisor: Cathleen Mochal-King DVM, MS, DACVS-LA

Introduction

Lameness is the most common medical problem described in the horse. In fact, half of all equine surgeries are lameness related. This is quite problematic as diagnosing and localizing lameness in horses can be difficult for an equine practitioner.

Reports state that 3% of horses die or are euthanized yearly because of lameness, and it is estimated that 70% of horses usually recover from their lameness incidents [9]. However, the lameness evaluation can prove to be long, tedious, and confusing for many novice practioner's. Lameness detection in horses was shown to be a moderately difficult skill [8]. To perform and diagnose a lameness successfully several factors should be kept in mind: common lameness's occur often, the discipline the horse is used for, a thorough history, and finally the lameness evaluation [12].

Lameness can be the result of trauma; either single incident or repetitive motion, congenital defect, developmental defect, infection, metabolic or nervous system disorder, or a combination. The most common type of lameness is acquired pain from within the musculoskeltal system [3]. The objective of the lameness examination is to determine the origin of the lameness, the cause of the problem, the treatment, and the prognosis.

A subjective evaluation of lameness by watching the horse in motion is a standard of practice [8]. The purpose of this paper is to review current literature regarding the best practices for evaluation in a lameness examination today.

History

The medical definition of lameness is being incapable of normal locomotion, or a deviation from the normal gait [14]. Lameness itself is not a disease, but is rather a clinical sign, a manifestation of pain, or a conformation defect that results in an abnormal gait. The lameness evaluation should be performed in order to localize the source of the pain, or mechanical defect in the horse. This comprehensive exam should be performed in an orderly fashion. However, many factors might change or shorten your exam, including financial constraints of the owner or the source of the lameness can be identified easily, such as a fracture [14]. The general lameness examination includes the following tests:

1. History and physical exam
2. Signalment and use
3. Visual examination at rest
4. Palpation and manipulation
5. Visual exam during exercise
6. Flexion tests
7. Diagnostic anesthesia
8. Diagnostic imaging

Each of these steps will be discussed in further detail below.

History and Physical exam

A detailed clinical history of the animal is a critical first step. Asking the owner or trainer specific questions can help localize the lameness early on. Some key questions should include: When did you first notice the lameness? How has your horse's performance altered? What is your horse's exercise and performance schedule (example 4 rides per week, 2 weekend shows per month)? Has the lameness worsened, improved, or stayed the same? What medications have you been administering to your horse? What performance maintenance treatment protocols is your horse on? What additional treatments have been started (shoeing or injections) and has any improvement been seen since starting treatment[3]?

A physical exam should then be performed to rule out other issues that need to be addressed before further investigation into the lameness begins, specifically infectious or neurologic causes of lameness.

Signalment and Use

The horses' age, sex, breed, and use may seem like basic information, but are actually important considerations in determining the lameness. Learning the common lameness that occur with age related, developmental lameness, or with other certain disciplines will be a key factor in detecting the lameness at hand. Horses that are less than four months of age often have lameness associated with infection and sepsis. Young foals are prone to traumatic fractures or developmental orthopedic problems. Racehorses often have lameness associated with high motion joints (carpus and fetlock) or stress related fractures within these high motion joints [3]. Repetitive movements combined with certain performance horses cause predictable injuries for example palmar heel pain in western performance horses, stifle lameness in reining and cutting

horses, and carpal injuries in thoroughbred race horses [11]. With older horses osteoarthritis, and degenerative diseases should be considered [14].

Visual examination at rest

The visual exam at rest allows the examiner to view if the horse is standing square. Look at the conformation, posture, and body type of the horse. Start by looking from far away to access the entire animal for balance, angles and length, posture, and symmetry [14]. Look up close for symmetry, swelling, and muscle atrophy of the limbs [3]. Is the horse placing all four feet on the ground or is there a shifting leg lameness or any toe pointing?

Palpation and manipulation

Subtle abnormalities can be accessed through palpation that may have gone unnoticed through the visual exam at rest. Palpate each limb and the axial skeleton of the horse. This part of the exam also included hoof testing the horse. The hoof testers allow for deep palpation of the sole, frog, and wall of the hoof [3].

Visual exam during exercise

Several scored exercise tests are used for this part of the exam including: straight-line movement, circling, lunging, and while ridden. The examiner should be looking at any abnormalities in head movement, gait, length of stride, height of foot flight, foot placement, gluteal symmetry, and movement of pelvis [3]. Forelimb lameness is most evident by a head nod and stride length. Rear limb lameness can be assessed by pelvic rise, change in vertical distance of the tuber coxae of the affected limb and increased fetlock drop in the sound rear limb.

The lameness scoring scale that is used in America is the American Association of Equine Practitioners guidelines. This is a scale from 0-5, 0 indicating a normal sound horse and 5 representing a non-weight bearing maximum lameness. Differences in examiners skill level have a significant effect on the lameness evaluation especially between grades 0-3 [9].

Lameness is most evident visually at the trot [3]. An obvious lameness may be seen at a walk, while more subtle lameness's are only brought out until the horse is moving at faster speeds or circling. It has been shown that speed does not affect lameness while the animal is circling or lunging [15]. The speed at which a horse is moving in a straight line can affect your exam. It has been reported that horses at higher speeds were found to be more sound than horses traveling at lower speeds. Therefore, when performing the straight line test it is best to use a slow trotting speed [15].

Lunging or circling a horse allows you to see a lameness not seen in a straight line. This is because the stress on a horses body when exercising on a circle or lunging are much higher than when working on a straight line. Further more the inner limbs work on a smaller diameter circle than the outer limbs this influences torque and other factors [5]. It has been reported that it is easier to detect forelimb lameness while lunging a horse than hind limb lameness's [8].

There has been increasing school of thought that sometimes a lameness can only be brought out when horses are ridden [5]. It has been reported that during a lameness examination a "problem perceived by the rider during ridden exercise may not be accurately represented in hand and on the lunge," because " the magnitude of the forces applied to a horse's thoracolumbar region increases with the rider bodyweight" [5].

There is now new technology that may aide in the lameness exam. Digital gait analysis systems can be used within clinics and in the field. They use inertial sensors that help detect

asymmetry in the gait of a horse [13]. They should not be used as a stand-alone test to gauge lameness.

Flexion tests

Flexion tests are used to further isolate areas on the limb to exacerbate the lameness [10]. Pressure is applied to a joint ranging from 100- 300 N for 30-60 seconds to an area on the limb beginning low to high on the limb [4]. The goals of a flexion test are to increase discomfort in the affected joint that will result in a transient increase in lameness as a result of the test. Particularly in the rear limb due to the reciprocal apparatus joints are not easy to isolate. When a flexion is performed more than one joint is flexed. However, due to the flexion being performed one joint is flexed more significantly than the others. An example of this is a hock or spavin test in which the hock is maximally flexed but part of the stifle and hip are as well. If the horse's response to this flexion is a a significant positive, then the result of the flexion suggest the hock is affected more than the other joints.

Diagnostic anesthesia

Diagnostic anesthesia utilizes perineural anesthesia as well as intrasynovial anesthesia. Local anesthetics are injected subcutaneously around specific nerve structures to specifically identify the lame region. Not only does this allow you to identify the lameness, but also it proves the lameness is caused by pain, and not a mechanical issue [6]. Diagnostic anesthesia is contraindicated when a fracture is suspected. Commonly used anesthetics are lidocaine, bupivacaine, and carbocaine. The anesthetic should start distally and work proximally. The purpose of starting distally is to eliminate false interpretations of diagnostic anesthesia. For

example if a lameness examination begins with a “high- 2 point” block of the forelimb. The block will have successfully anesthetized all structures below the carpus. Thus making it difficult to interpret because, the cause of the lameness could be within the foot, pastern, fetlock or cannon region. The majority of lameness’s arise from the fetlock down. Keep in mind the amount of anesthetic used, larger volumes of drug will diffuse further. Too much may block higher areas skewing test results [3]. If the lameness is only partially gone this may result in a more chronic problem or a combination of injuries [6].

Diagnostic imaging

When an area of the limb has been identified in the lameness evaluation diagnostic imaging can help further the investigation to determine the cause of the lameness. This part of the lameness exam gives the examiner information about bone formation, joints, and soft tissue structures. Radiographs, ulstrasound, MRI, and Nuclear scintigraphy can all be used to locate and identify the problem.

Treatment and Management Options

The treatment and management options will vary depending on the cause of the lameness. Once the cause and area of the limb that is lame has been identified a treatment option can commence. There should be a follow up exam at a later date and another lameness evaluation performed to determine if the lameness has been eliminated and the horse can return to its normal workload.

Expected outcome and prognosis

The expected outcome and prognosis of lameness varies depending on the diagnosis. In one study it was reported that less than 3% of horses die or are euthanized because of lameness, and it is estimated that 70% of horses usually recover from their lameness incidents [9].

Conclusion

Lameness is the most important problem faced by horse owners and trainers. A diagnosis of the cause of the lameness is done by conducting a step-by-step lameness evaluation. You may find that your evaluation may be tailored on an individual basis, specifically in financially limited clients, or because the lameness can be obviously observed early on. The full lameness evaluation consists of getting a thorough history, signalment, and determining the discipline the horse is involved in. Following questioning, the horse is assessed visually at rest looking for issues with conformation, symmetry, and posture. The horse is palpated and a closer examination of anatomic structures are assessed. The horse is then exercised and evaluated during a straight-line test, circling, lunging, and ridden tests scored using the AAEP scoring scale. Flexion tests, local anesthetic tests, and diagnostic imaging all help specifically localize the lameness. Finally after a diagnosis has been made, treatment can be started. Detecting a lameness accurately takes an experienced equine practitioner. It has been said that the, "successful detection of equine lameness does not so much require knowledge of science as it does art" [14].

References

1. Armentrout, A. R., W. L. Beard, B. J. White, and J. D. Lillich. "A Comparative Study of Proximal Hindlimb Flexion in Horses: 5 versus 60 Seconds." Equine Veterinary Journal 44.4 (2011): 420-24.
2. Audigié, Fabrice, Philippe Pourcelot, Christophe Degueurce, Didier Geiger, and Jean Marie Denoix. "Fourier Analysis of Trunk Displacements: A Method to Identify the Lame Limb in Trotting Horses." Journal of Biomechanics 35.9 (2002): 1173-182.
3. Baxter, Gary M. Manual of Equine Lameness. Chichester, West Sussex, UK: Wiley-Blackwell, 2011. Print.
4. Busschers, E., and P. R. Van Weeren. "Use of the Flexion Test of the Distal Forelimb in the Sound Horse: Repeatability and Effect of Age, Gender, Weight, Height and Fetlock Joint Range of Motion." Journal of Veterinary Medicine Series A J Vet Med Series A 48.7 (2001): 413-27.
5. Dyson, Sue, and Line Greve. "Subjective Gait Assessment of 57 Sports Horses in Normal Work: A Comparison of the Response to Flexion Tests, Movement in Hand, on the Lunge, and Ridden." Journal of Equine Veterinary Science 38 (2016): 1-7.
6. Gaughan, E. M. Local Anesthesia in the Equine Lameness Examination. Proc. of Proceedings of the North American Veterinary Conference. Large Animal Edition. Print.
7. Hammarberg, M., A. Egenvall, T. Pfau, and M. Rhodin. "Rater Agreement of Visual Lameness Assessment in Horses during Lungeing." Equine Vet J Equine Veterinary Journal 48.1 (2015): 78-82.
8. Keegan, K. G., E. V. Dent, D. A. Wilson, J. Janicek, J. Kramer, A. Lacarrubba, D. M. Walsh, M. W. Cassells, T. M. Esther, P. Schiltz, K. E. Frees, C. L. Wilhite, J. M. Clark, C. C. Pollitt, R. Shaw, and T. Norris. "Repeatability of Subjective Evaluation of Lameness in Horses." Equine Veterinary Journal 42.2 (2010): 92-97.
9. Keegan, Kevin G. Evidence-Based Lameness Detection and Quantification. Veterinary Clinics of North America: Equine Practice 23.2. 2007: 403-23.
10. Marshall, J. F., D. G. Lund, and L. C. Voute. "Use of a Wireless, Inertial Sensor-based System to Objectively Evaluate Flexion Tests in the Horse." Equine Vet J Equine Veterinary Journal 44 (2012): 8-11.
11. Menarim, Bruno Carvalho, Vânia Maria Vasconcelos Machado, Luís Emiliano Cisneros Alvarez, Rodrigo Carneiro, Leandro Busch, and Luiz Carlos Vulcano. "Radiographic Abnormalities in Barrel Racing Horses with Lameness Referable to the Metacarpophalangeal Joint." Journal of Equine Veterinary Science 32.4 (2012): 216-21.
12. Mochal-King, Cathleen. "LAMENESS: A SIMPLE APPROACH TO PERFORMING A LAMENESS EVALUATION." 2 May 2016. Lecture.
13. Pfau, T., H. Boultbee, H. Davis, A. Walker, and M. Rhodin. "Agreement between Two Inertial Sensor Gait Analysis Systems for Lameness Examinations in Horses." Equine Vet Educ Equine Veterinary Education 28.4 (2015): 203-08.
14. Ross, Mike W., and Sue J. Dyson. Diagnosis and Management of Lameness in the Horse. Philadelphia, PA: W.B. Saunders, 2003. Print.
15. Starke, Sandra D., Kirsty J. Raistrick, Stephen A. May, and Thilo Pfau. "The Effect of Trotting Speed on the Evaluation of Subtle Lameness in Horses." The Veterinary Journal 197.2 (2013): 245-52.