Determining the Effect of Lunging on Lameness Locator™ Results

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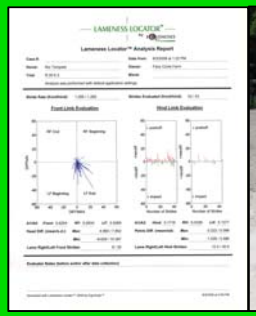
Abstract

The Lameness Locator™ is a wireless, inertial sensor-based measurement system that quantifies asymmetry of vertical torso movement for objective detection and evaluation of lameness in horses. Validation trials of Lameness Locator™ for detection and evaluation of lameness when the horse is trotting in a straight line are completed. However, because it is thought that many lameness conditions in horses exhibit asymmetric vertical torso movement only when the horse is moved in a circle, it is common for equine practitioners to evaluate the horse for lameness by lunging. The threshold values between soundness and lameness and the precision of asymmetry measurements for Lameness Locator™ have not been determined for lunging. The purpose of this study is to determine these values. We will use Lameness Locator™ to measure vertical torso movement asymmetry in 100 horses as they lunge in different sized circles in both directions. It is anticipated that there will be a natural but uniform amplitude of asymmetry of vertical torso movement as the horse is trotting in a circle and that this asymmetry will negatively correlate with radius of the circle in which the horse is trotting. We also anticipate that the asymmetry of torso movement as the horse is lunging to the left will be equal in amplitude but opposite in direction to when the horse is lunging to the right. Determination of the threshold values between soundness and lameness and the test-retest precision of Lameness Locator™ for the lunge will strengthen the clinical utility of Lameness Locator™.

Objective

To determine if Lameness Locator™ results will be significantly different when the horse is lunging compared to trotting in a straight line.



Hypothesis

If the Lameness Locator ™ is used to measure 100 horses' asymmetry at a trot on a straight line, a large circle and a small circle, then the Lameness Locator™ will find an asymmetry associated with the radius of the lounging circle compared to results on a straight line.

Methods

The University of Missouri, College of Veterinary Medicine has developed a wireless sensing devise, the Lameness Locator™, which will be used to record and evaluate lameness the horses in this study. The sensors on the head and pelvis measure acceleration. The sensor on the right forefoot measures angular velocity. Algorithms have been developed to interpret the data that the sensors collect. The sensors consist of a radio transceiver, battery, micro-controller and associated circuitry. The first sensor will measure vertical acceleration and is placed on a head bumper that attaches to the halter of the horse. It rests on the poll and is easily detachable due to 3M dual hook tape. The second sensor is placed on the dorsum of the pelvis with adhesive strips and dual lock tape between the tubera sacrale. The third sensor is taped to the dorsal aspect of the right forelimb pastern.

Approximately 100 horses will be used in this study. As a requirement for selection, the horses must be trained to lunge. Information will be collected on each horse and entered into the Lameness Locator™ database. The data will be collected over level ground. The radius of a small circle will be 10 feet. The large circle will have a radius of 20 feet.

Results

Results for the study are in progress. We are anticipating that that thresholds for soundness trotting in a straight line are different that for a circle. We expect to have the deflections on the circle be equal and opposite depending on the direction.

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