# Optimal Equine Balance: Application of Biophysics to Assess and Reduce Equine Injury, Phase II

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When equines fracture their phalanx, the most common ‘treatment’ is euthanasia because of the high cost and risk of surgery. Additionally, few non-invasive preventative measures and/or treatments have been found to prevent P2 injuries. The purpose of this project was to investigate the application of existing digital technology to improve video analysis of a horse’s phalanx, while studying the fracture pathology of the P2 bone and to develop risk mitigation strategies. A secondary outcome is the ability to observe and predict a horse’s medical predisposition and maximum athletic performance potential, by observing speed and accelerations at natural gaits. This project used non-invasive test methods by incorporating video analysis with three-dimensional motion data and the application of physics principles, to generate reliable data to substantiate a horse’s conformation and soundness. The motion and forces exerted on the P2 bone before, during, and after impacting the ground were examined using the aforementioned methods. High-speed cinematography was combined with digital accelerometers to capture three dimensional data for in-depth analysis and to identify and investigate anomalies that could be associated with the specific pathology that leads to phalanx fractures. To accomplish this, paper reference dots were placed on the left side of the horses front legs at the hoof, 1st, and 2nd phalanxes. Attach a small wireless accelerometer above the hoof adjacent to the P2 bone to gather data. Film each horse three times for each gait, in each test (10m straight line, circle, weave and 49cm jump). Videos were analyzed utilizing Logger-Pro software.

**Awards Won:**