The following wearable biometric sensor companies are taking part in a study organized by the American Association of Equine Practitioners: Alogo Analysis, Arioneo, Equibase/Stable Analytics, Equimetrics, Garmin, and StrideSAFE

# Early Diagnosis is Key in Detecting Joint Issues

*By* **AMANDA DUCKWORTH**

**KEEPING A HORSE** sound is a priority. For such a simple concept, it can be hard to execute based on a number of factors. Horses can go lame for myriad reasons, and joint health remains a widely studied area in equine science.

Early detection of issues is commonly cited as a goal for better equine health, but that can be easier said than done. Many efforts are underway to begin to identify issues before they lead to catastrophic outcomes.

In March 2025, the American Association of Equine Practitioners announced that its racehorse wearable biometric sensor research project is currently underway.

According to the AAEP, more than 700 2-year-old Thoroughbred racehorses are now wearing a biometric sensor as part of the year-long project to determine the effectiveness of sensors in injury detection.

Submission of sensor data to the project's data analyst began in mid-February, and data will only be collected during weekly high-speed workouts. Six sensor manufacturers are participating in the study: Alogo Analysis, Arioneo, Equibase/Stable Analytics, Equimetrics, Garmin, and StrideSAFE.

"The AAEP is excited to be on the forefront of sensor technology," said Dr. Katie Garrett, AAEP immediate past president and The Foundation for the Horse board chair. "We see this as a transformational opportunity to further protect the health of our equine athletes. We are incredibly grateful to the Thoroughbred industry groups who share our goal and are making this project a reality."

Racing organizations that contributed funding to the study include: Breeders' Cup Limited, Fasig-Tipton, The Foundation for the Horse (the charitable arm of the AAEP), Keeneland Association, Kentucky Thoroughbred Association, New York Racing Association, New York Thoroughbred Horsemen's Association, Oak Tree Racing Association, Ocala Breeders' Sales, and Thoroughbred Owners and Breeders Association.

"The support by the industry has been just tremendous, from the nearly $1 million in project funding from industry groups to the owners and trainers who volunteered their 2-year-olds to participate in the study," said Dr. Sara Langsam, AAEP racing committee chair. "It is a testament to the industry's dedication to making our sport even safer. We are all very excited to see what the data will yield."

According to the AAEP, wearable biometric sensors have shown promise as an early warning system for the identification of racehorses at increased risk of musculoskeletal injury. These sensors are designed to capture data on a horse's movement patterns during high-speed events.

Early detection is a priority for many. Sleip released its 2025 Equine Lameness Insights report in September. It included responses from more than 100 orthopedic veterinarians in the International Society of Equine Locomotor Pathology.

According to the report, lameness

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remains a top clinical concern, with joint disease and soft tissue injuries most frequently cited as causes. It found that 95% of participating veterinarians said they regularly see cases where earlier veterinary intervention could have led to a better outcome.

The report also examined current use of objective gait analysis, including smartphone-based AI tools that help detect subtle asymmetries earlier and track movement over time.

Some key takeaways were that 44% of vets expect gait analysis to become a standard tool within five years, and more than 60% have already used it in their clinical practice; 80% say that access to historical movement data would be valuable in their clinical work; and 75% would use such tools in pre-purchase exams.

**Dr. Katie Garrett, past AAEP president and board chair at Foundation for the Horse**

"Earlier isn't just better, said Dr. Elin Hernlund, biomechanics researcher and chief medical officer at Sleip. "It can be the difference between recovery and retirement. And the better the history, the better the decision. Objective data give vets and the whole team a shared language."

Studies have shown that about 60% of lameness in horses is due to arthritis. Equine joints are affected by the progressive deterioration of cartilage, but many people miss the early signs of joint disease and attribute it to training and/or attitude issues. However, if the problem can be caught early and treated, a return to having a productive career is more than possible.

In September 2025, the Equine

Veterinary Journal published "Metabolomic and proteomic stratification of equine osteoarthritis."

"Equine osteoarthritis (OA) is predominantly diagnosed through clinical examination and radiography, leading to detection only after significant joint pathology," explained researchers. "The pathogenesis of OA remains unclear and while many medications modify the disease's inflammatory components, no curative or reversal treatments exist.

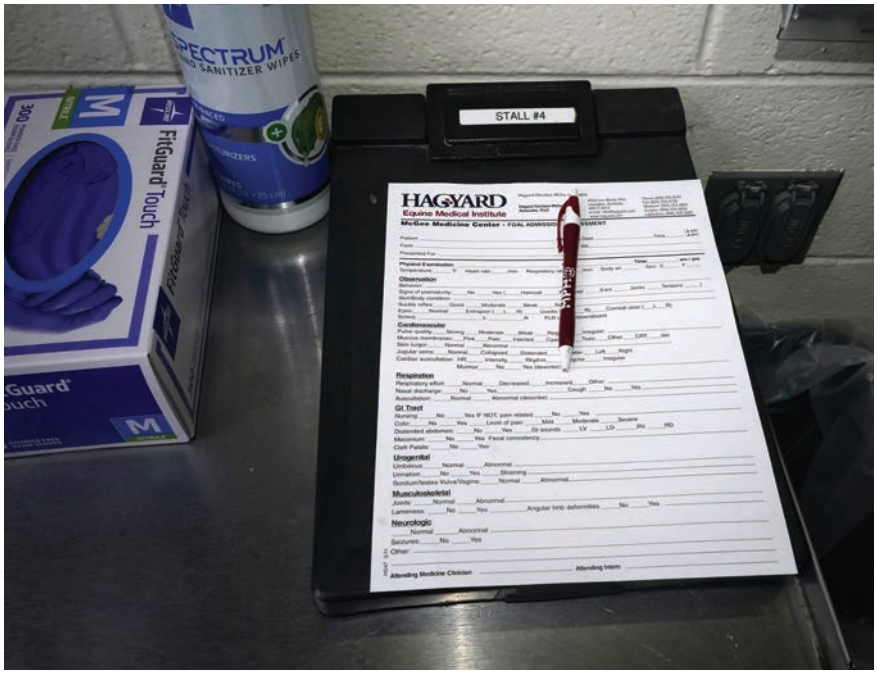
"Identifying differentially abundant metabolites and proteins correlated with osteoarthritis severity could improve early diagnosis, track disease progression, and evaluate responses to interventions."

The goal of the cross-sectional study was to identify molecular markers of osteoarthritis severity based on histological and macroscopic grading. Researchers collected post-mortem synovial fluid from 58 Thoroughbred racehorse joints and 83 joints from mixed breeds.

According to researchers, those joints were histologically and macroscopically scored and categorized by OA and synovitis grade. Additionally, synovial fluid nuclear magnetic resonance metabolomic, and mass spectrometry proteomic analyses were performed, individually and combined.

"In Thoroughbreds, synovial fluid concentrations of metabolites 2-aminobutyrate, alanine and creatine were elevated for higher OA grades, while glutamate was reduced for both Thoroughbreds and mixed breeds," researchers concluded. "For Thoroughbreds, gelsolin concentrations were lower for higher OA grades, and afamin was lower at a higher synovitis grade. Correlation analyses of combined metabolomics and proteomics datasets revealed 58 and 32 significant variables for Thoroughbreds and mixed breeds, respectively.

"Following stratification of equine OA severity through histological and macroscopic grading, synovial fluid metabolomic and proteomic profiling identified markers that may support earlier diagnosis and progression tracking. Further research is needed to correlate these markers with clinical osteoarthritis severity."




**Hagyard Equine Medical Institute shared medical records of Thoroughbreds that had surgery for lateral trochlear ridge with the study purpose of investigating the relationship "between lesion size, racing performance, and sale result of Thoroughbreds with LTR OCD following arthroscopic removal as a yearling."**

In November 2025, the Equine Veterinary Journal published "Post-mortem computed tomography features associated with fracture of the fetlock joint in racing Thoroughbreds."

"Post-mortem studies have shown that fractures involving the metacarpophalangeal/metatarsophalangeal or fetlock joint are associated with focal areas of microdamage," explained researchers. "Identification of computed tomography (CT) features consistent with microdamage and their association with fracture may aid in identification of horses at risk of fracture."

For the retrospective cohort study, the post-mortem CT images of 367 limbs from 157 Thoroughbred racehorses were graded for CT features. Multivariable logistic regression models were generated, and intra-class correlation coefficients of key CT features to assess intra and inter-rater reliability were calculated.

Researchers concluded that the presence of lysis within the subchondral/trabecular bone underlying the lateral and, or, medial parasagittal groove of the


**StrideSAFE's wearable sensor was founded in 2019 by Dr. David Lambert**

THIS PAGE, TOP: MATHEA KELLEY; BOTTOM: COURTESY OF DR. DAVID LAMBERT; OPPOSITE PAGE: COADY MEDIA/BARBARA BARCLAY

**Productive racing careers are tied to early detection of joint issues**

distal third metacarpus/tarsus and sclerosis of the palmar subchondral and trabecular bone underlying the lateral and medial PSG that projected proximoaxially were associated with condylar fracture.

"The presence of a proximal sesamoid bone (PSB) lytic lesion and increasing medial PSB density were associated with PSB fracture," researchers concluded. "Palmar osteochondral disease grade was not associated with condylar or PSB fracture. Inter rater reliability was moderate for the presence of PSG lysis and shape of sclerosis in the lateral condyle.

"CT examination of fetlock joints post-mortem identified changes associated with both metacarpal condylar fracture and PSB fracture in racehorses. These findings show that pre-race CT screening has the potential to reduce fracture rates."

Several recent studies worldwide have also looked at racing success following surgery to help with osteoarthritis issues.

In March 2024, "Racing Performance and Sale Result in 145 Thoroughbreds after Arthroscopic Removal of Osteochondral Fragments from the Lateral Femoral Trochlear Ridge as a Yearling (2012-2015)" was published in Veterinary and Comparative Orthopaedics and Traumatology.

"The lateral trochlear ridge (LTR) of the femur is the most common predilection site for osteochondritis dissecans (OCD) in the equine stifle," explained researchers. "The objective was to investigate the relationship between lesion size, racing performance, and sale result of Thoroughbreds with LTR OCD following arthroscopic removal as a yearling."

For the retrospective study, the medical records of 145 Thoroughbreds from Hagyard Equine Medical Institute that underwent surgery for LTR OCD were reviewed, and the length and depth of the lesions were measured on preoperative radiographs.

Group S horses were presented at public auction as yearlings following surgery, while Group NS horses were not offered for sale. Group C served as the control group. Each horse from group S was matched with two control horses from the same sale (group C).

"Lesion length and depth did not affect racing performance and did not differ between group S and group NS," researchers concluded. "However, group S did perform significantly better than group NS. When comparing groups S and C, there were no significant differences in racing performance and sale result.

"Thoroughbreds that had arthroscopic surgery for LTR OCD as a yearling and were presented on a public yearling sale performed comparable to Thoroughbreds that showed similar potential as a yearling. Sale result is not significantly affected in our study."

In August 2025, Veterinary Journal published "Racing performance in 75 Thoroughbreds after arthroscopic removal of Osteochondritis dissecans from the lateral femoral trochlear ridge before first race start in Korea (2015-2017)."

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—DR. SARA LANGSAM, AAEP RACING COMMITTEE CHAIR

The retrospective study evaluated the medical and racing outcomes of 75 Thoroughbreds who underwent arthroscopic OCD removal at the Jeju Stud Farm Equine Hospital from 2015 to 2017. Medical records, radiographic assessments, and race performance data were analyzed. They compared 75 horses that underwent surgery with 257 control horses selected as siblings from the same dam.

Researchers found that the surgical group had comparable racehorse registration rates (89.3%) and first race start rates (72.0%) compared to those of the control group (84.8% and 74.7%, respectively). However, horses that underwent surgery had their first race start later and participated in fewer total races than the control group.

"Despite these differences, there were no significant variations in sales prices, career earnings, race points, or retirement age," researchers concluded. "Furthermore, neither the size of the OCD lesion nor the timing of the surgery significantly influenced overall racing performance metrics, except for a reduction in career duration for horses operated on at an older age. Sex-based analyses revealed that male horses consistently outperformed females in career duration and earnings. Subgroup analyses revealed significantly poorer outcomes in females treated before 12 months of age and those with large lesions, including fewer starts and earlier retirement.

"In summary, arthroscopic surgery for stifle OCD in Thoroughbreds before their first race start did not negatively affect overall performance. While lesion size and surgery timing had minimal impact, this study suggests that sex-related factors may more strongly influence post-surgical outcomes."

**Dr. Sara Langsam is AAEP's racing committee chair**

In July 2025, Veterinary Surgery published "Outcome of arthroscopic debridement for the treatment of incomplete third carpal bone slab fractures in racehorses."

The retrospective case study reviewed the medical records of horses surgically treated for incomplete slab fractures (ISF) of the third carpal bone (C3) were reviewed.

Data included age, sex, breed, limb, fracture configuration, preoperative radiographs, arthroscopic findings, postoperative intraarticular therapies, and exercise recommendations. In all 33 horses fit the study criteria, including 19 Thoroughbreds and 14 Standardbreds.

"The postoperative racing rate was 66.7% (22/33 horses)," researchers concluded. "There was no statistically significant difference in outcome between dorsal and sagittal fractures or breeds. There were no significant differences in earnings per start or total earnings before and after surgery. Several horses showed an increase in racing frequency and an increase in earnings post-injury. Most horses, 81.8% (27/33), had at least one career start prior to undergoing surgery. The median convalescent period was 247.1 days.

"Early diagnosis and subsequent arthroscopic debridement of C3 ISF was a viable treatment approach with a favorable prognosis for racing postoperatively. Early detection and arthroscopic debridement of ISF before progression to a complete slab fracture and/or subsequent osteoarthritis of the joint could improve athletic outcomes."

Joint health is an ever-important topic when it comes to equine welfare. As is true with many equine health-related topics, noticing changes in a horse's behavior or movements and working with a trusted veterinarian is a key component to having a best-case scenario.

Additionally, research is being done around the world to improve early diagnosis, which in turn will likely lead to better outcomes for all involved. BH

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