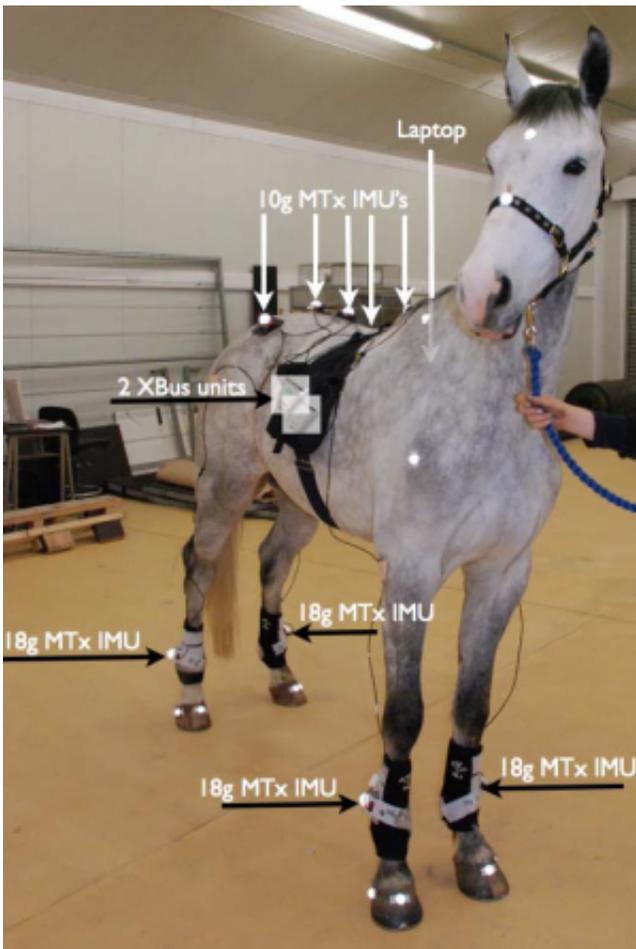


# Important step forward for gait analysis of horses

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A state of the art gait laboratory use infrared motion capture measurements of movement in three dimensions &#8211 a number of reflective markers are attached to the horse, and the resulting movement in a three-dimensional space are interpreted in a computer. Credit: Sensors

Horses who develop a limp are one of the major sources of frustration for horse owners as well as vets. The same applies for Wobblers disease (ataxia) where growth abnormalities or articular process joint osteoarthritis put pressure on the spinal cord causing ataxic gait. At least one in a hundred horses develop Wobblers disease, which often leads to the horse having to be euthanased. Both lameness and Wobblers disease have an effect on a horses gait, and so far veterinarians have only been able to study horse movement in a gait-laboratory, which commonly only allows study of a few steps at a time on a straight line.

Using inertial sensors; small sensors containing technology like what you find in a cellphone, i.e. [gyroscopes](#), [accelerometers](#) and magnetometers, veterinarian and PhD from the Faculty of Health and Medical Sciences at University of Copenhagen, Dr. Emil Olsen and his collaborators from Dr. Thilo Pfau's research group at Royal Veterinary College in the United Kingdom have managed to measure horse movement (displacement) as well as the timing of the hoof's contact with the ground very accurately.

"Our previous research shows that inertial sensors placed right above the horse's fetlock joint can be used to reliably determine the timing of the hoof's contact with the ground. Furthermore, we're a big step closer to being able to measure movement during training of a horse under real-life conditions, because we have also managed to validate the method against the reference standard [motion capture](#), and this provides us with tools to evaluate the development and change in coordination and symmetry simultaneously," Doctor of Veterinary Medicine and PhD Emil Olsen explains.

## **Better, cheaper treatment**

Using this new method, veterinarians will be able to analyse the movement patterns of [horses](#) with [lameness](#) much better than before.

Professional trainers will also be able to utilise the sensors, i.e. to check whether a horse actually moves rhythmically, which is an important criteria in dressage as well as other equestrian disciplines.

Strictly scientific, the sensors are also quite interesting, as researchers will be able to look into the motor skills and [movement patterns](#) of horses in a much more thorough way than previously, although veterinarians are the primary target of the new method.

"Our goal with this new system is to achieve a broader screening of the horse's coordination, and through that, to be able to discover diseases and problems earlier. It will also be possible to monitor diagnostics and rehabilitation outside the gait lab with equipment economically within reach for most vets," Emil Olsen adds.

The sensor system has already hit the market, an example is Equigait, a product developed by Emil Olsen's PhD supervisor Dr. Thilo Pfau. The new research results presented here haven't yet been implemented in any particular product.

**More information:** The new research results have just been published in the article "Functional limits of agreement applied as a novel method comparison tool for accuracy and precision of inertial measurement unit derived displacement of the distal limb in horses" in the *Journal of Biomechanics*.

Provided by University of Copenhagen

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