A scientists’ journey: cutting-edge research into lameness in horses

AS EVERY HORSE OWNER AND VET will know only too well, lameness can be a very serious issue for horses. It has been identified as the most common reason for older horses to be put down and can affect the health and well-being of horses of any age.

The Royal Veterinary College’s Equine Hospital is a leader in its field and helps to treat lameness as well as many other ailments that can afflict horses. But across the way from the emergency room, there is a research centre at the RVC that goes to the heart of this issue, and conducts cutting-edge research that is expanding our body of knowledge and understanding into the causes, diagnostics and treatment of lameness.

It is known as the RVC’s Structure and Motion Lab, a world-renowned research facility for investigating locomotion in animals, led by Professor Alan Wilson, where I have had the pleasure of working for nearly 10 years.

Primarily, we use technological aids to reduce the subjectivity of lameness examinations, as well as to enhance our understanding of the biomechanics of lameness.

As a number of our early studies into the limits of human perception of lameness showed, you might be surprised how difficult it is to detect small movement asymmetries with the untrained eye, and how much goes into the mechanics of horse movements that we can barely see.

Considering my academic background in computer science, it was a natural next step to bring technology into the limits of human perception – as well as giving tools to those who are not experts.

But the effects of our research can go so much further than that. It can provide essential progress towards evidence-based decision-making – helping clinicians to diagnose and treat lameness effectively by isolating specific causes and effects.

Observing phenomena

During a lameness examination, we observe lots of phenomena in horse movement – head nod, hip hike, movements of the withers, length of stride, etc. – all of different magnitudes and intensities, and all affected by the horse’s pain. It is clear that people struggle with conscious optimal decision-making when faced with so many parameters.

Increasingly, we are conducting research using technical aids and keeping parameters limited in number, to work out the exact impact of certain clinical interventions (e.g. numbing the pain – known as diagnostic analgesia) on a limited number of parameters (e.g. quantifying head nod and hip hike only).

We are also measuring other parameters that go beyond those currently understood as the main criteria for lameness and can relate to things sometimes more difficult to perceive by eye. Measuring more than just the head nod and hip hike can be useful.

For example, we have recently found that by measuring movement asymmetry in the withers, we can detect a difference between horses with induced forelimb lameness and horses with induced hind limb lameness.

Research found elastic bands are successful in rehabilitation programmes to treat lameness and back problems in horses.

Removing the bias

A crucial element of our research in these areas is to remove the bias inherent in human decision-making.

By putting into numbers what can be observed by the naked eye, we aim to remove the subjective element that can lead to disagreement between experts – as well as giving tools to those who are not experts.

In time, this research could lead to a complete transformation of lameness diagnostic examination – where a specific effect will very precisely and confidently be linked to a specific cause – due to our expanded collective body of knowledge in this area and our deeper understanding of all related causal relationships.

My scientific journey over the last 10 years has been a transformative one, allowing me, significantly helped by the undergraduate and postgraduate students and in collaboration with clinicians and researchers both at the RVC and elsewhere, to apply my background and skills in computer science to the complex, real-life task of detecting and quantifying lameness in horses.

There are still many questions left unanswered; however, I am optimistic that continuing progress will be made and that the work of researchers around the globe in this fascinating area is helping veterinarians to make confident decisions, particularly when faced with “tricky” horses presenting with subtle lameness and performance issues.