

quine biomechanics is a complex but interesting subject, especially for those of us who ride or train horses. If we don't understand the basics of their physiology and range of movement, how do we know that our training programme is suitable, or that the way we ride is comfortable for the horse?

Evolution: outstanding athletes...

Russell Guire runs Centaur Biomechanics www.centaurbiomechanics.co.uk, carrying out 'performance analysis' checks and evaluating biomechanical data of both horses and riders. "I believe it is very important for both rider and trainer to be aware of the way in which the horse moves," he explains. "Evolution has allowed horses to become outstanding athletes, largely due to their power and speed; the modern horse can carry out various movements and jump obstacles which would have not been necessary for feral horses. Although horses have adapted well, the increased pressures placed on them can unfortunately cause stresses and strains, so it is vital that we understand their

physiology and individual capabilities." At its most basic, this involves studying the horse's gait – watching the sequence of the footfalls. The sequence in walk is: left hind, left fore, right hind and then right fore. Counting the four-time rhythm actually helps the rider to develop an active, regular pace when riding, while visually checking to see whether the footprint of the hind foot lands in that of the front is a good guide to a horse's straightness.

Trot is a 'two-time' pace working in diagonal pairs; the left hind and right fore move together, followed by the right hind and left fore. Meanwhile, canter is a three-time rhythm – the off hind engages first, followed by the inside hind and outside fore together, and lastly the inside fore.

Understanding the foot falls can actually help the rider influence the way the horse moves and regulates its pace, and also helps the rider understand when the horse is best placed to carry the rider's weight; for example, in trot the rider should be sitting when the outside fore and inside hind are on the ground, e.g. 'on the correct diagonal'. "The rider should be able to visualise the pattern the horse's limbs are making while carrying out various movements. This will help develop a better feel for what is correct and a greater overall understanding of how the horse moves," adds Russell.

The importance of balance and symmetry...

Aside from carrying the rider effectively, a well-balanced horse is able to perform at his optimum. From the feet up, good symmetry is desirable in order to reduce strains and injury - for example, feet that are aligned and balanced, and a stride that is equal in length when the horse covers ground, will support the horse's body structure, both with and without a rider. Many horses, and people for that matter, are not wholly symmetrical or aligned on both sides in equal measure; but understanding the ideal physical scenario helps us to identify any potential problems the horse may have, such as a weak hind leg that lacks power, or a lower leg that 'dishes' out from the knee. (portrait legs pic 2 - hi)

Screening using video-based technology...

Performance analysis using video-based

BIOMECHANICS



How does performance analysis work?

1. The horse is 'marked-up' using sticky markers on the joints, and also required measurement locations, such as the cannon bone.

2. The horse is filmed in walk and trot on a hard, level surface, showing left, right, anterior and posterior views. The analysis shows the horse's movement in slow motion or frame by frame, assessing data such as the reaction between the hoof and the ground.

3. Selected footage is taken for review and further analysis.

4. An technician reviews the resulting measurements and data.

5. A CD and report is created for the client within around 24 hrs.



Spencer Wilton and Dolendo, is part of BEF's World Class Performance programme, which provides its horses and riders with Equinalysis screening.

technology to record movement has been around for a long time in the field of human medicine, but is a more recent commodity in the field of horse care. Screening a horse for 'kinematic data', e.g. information about how he moves, can prove invaluable in the training or rehabilitation process, or even when purchasing a horse. The screening can potentially pick up elements such as stride length and therefore potential speed of the horse, conformation issues that could be improved by remedial farriery, and foot balance - for example, particularly boxy or flat feet will affect the loading of the limb and ultimately the horse's performance and soundness. Therefore, it can prove an invaluable tool for anyone purchasing a horse, and can be used to successfully clarify and evaluate problems picked up at a horse's five stage vetting.

Screening a horse biomechanically is also useful in terms of assessing progression through a fitness programme – imagine how useful it would be to have video footage and data of a young horse, pre-training and maturity, and to keep a regular record of physiological aspects such as stride length and fetlock flexion as he responds to training and gains in strength.

Having a good understanding of



Markers are attached to record the horses movement.

equine movement and / or physiology is also useful in the event of injury and rehabilitation – for example, would you know exactly how fast and athletic your horse was previously – did he have a 'bad' or stiff side? Did he always go disunited in canter on one rein – perhaps 'saving' his weak hind leg? Or was he particularly inflexible through one side of his neck?

Knowing a horse's individual makeup can also prove invaluable in terms of assessing a problem, for example knowing if he is slightly un-sound when riding, even if it is not noticeable to the eye. A rider with a good understanding of how his or her horse moves may also notice subtle changes, such as a sudden lack or coordination on one rein, a loss of power in canter, or a lack of enthusiasm to perform a particular movement.

Video-based performance screening does not take the place of an owner's understanding of their own horse, but rather completes the package – for example, by allowing the owner to see their horse move in slow motion from all angles, or by illustrating that one foreleg stride is a fraction longer than the other. Put together with a rider's knowledge about their horse's physiology, it can potentially make a difference to a horse's competitive lifespan and can certainly help promote comfort and soundness. And isn't that something that we all strive for – a healthy, happy horse?

Prices from £95 to £275 ex VAT

There are a number of clinicians in the UK performing performance analysis using Equinalysis technology. Visit: www.equinalysis.co.uk for details, or to find someone local to you. Tel: OI29I 67I35I