Are you sitting comfortably?

The science of rider biomechanics isn't just for professional riders looking to improve their results, it can benefit riders of all levels, as *Catherine Welton* finds out

Riders benefit from dynamic versions of standard exercises – in this case plank on a gym ball rather than the floor

BACK in the day, "heels down and sit up" was about as scientific as things got. "Historically, we were focused on what the picture looked like, rather than the physical demands of riding," says Jennifer Symms, a chartered physiotherapist who runs Pegasus Physio.

Today, we have a better understanding of the athletic challenges of equestrianism. "Horses move in three planes of movement during riding; forwards, up and down vertically, and their barrel swings side-to-side with each stride," explains Sarah Claridge, also a chartered physiotherapist, of Meadow Physio and Pilates. "The rider's goal is to move with the horse, without interfering with its natural movement.

"Rider biomechanics refers to how a rider uses their body to balance, stabilise and produce an aid and thus a response from the horse. Good biomechanics complete a task with minimal effort and maximum effectiveness."

Whether we're aware of it or not, most of us are not as balanced or symmetrical as we could be. In fact, common rider issues are often a symptom of this, says Jennifer: "For example, a gripping leg is normally in response to your leg trying to keep you balanced or an underlying weakness."

But assessing your own position isn't easy, as Clare Howard, physiotherapist and owner of The Balanced Rider, explains.

"It's not accurate to rely on your own feedback that you feel level or straight. Our bodies compensate quickly and most of us aren't very precise in assessing ourselves."

Most riders are nursing more than their fair share of old injuries, and these can have a big impact on symmetry.

"As humans we have a natural instinct to avoid pain, so our body finds other ways to function," says Sarah. "This is where compensation strategies or asymmetries form. These then become the norm and we think we're straight, even though we're wonky."

"Mechanical horses" vary. Some are used as assessment tools, others are highly technical simulators giving feedback

EVEN without the inevitable "war wounds", riders come in all shapes and sizes, all of which affects our position.

"The centre of gravity for a rider is proportional to their height, shape, weight distribution, posture and movement patterns," Sarah says. "It is made more complicated by the height, shape, posture and movement of their horse."

For this reason, Professor Jane Williams, head of research at Hartpury University, believes that rider biomechanics should be considered alongside rider weight when it comes to assessing horse/rider suitability, welfare and safety.

"You might see someone very tall on a small horse, they might be very skinny so their overall weight wouldn't have an impact as such, but their height and balance can still affect the horse," she explains.

And this can have more of an effect than you might think.

"If a rider sits more heavily on one seat bone, that might be considered a minimal amount of weight imbalance," Clare explains. "But this will affect the horse on every single stride. It's repeatedly been shown that in trot and canter, the forces loaded onto the horse are twice and two-and-a-half times the weight of

Super stretches

1 To stretch the quads and hip flexors (helps with shoulder/hip/heel alignment), hook one foot up behind you on something about bottom height. Make sure your pelvis is straight and even, relax your pelvis forward and feel a stretch along the front of the leg that is up. For more of a stretch, slightly bend the standing leg. Repeat on the other leg.

2 Sit on the floor, with your legs wide and a straight back. Take hold of something in front of you at about shoulder height and then use that tension to fold gently a bit further forward. This will stretch the inside of your thighs and hip flexors.

3 Standing up with your feet hip-width apart, bend forwards and take a tight hold of your calves, elbows out to the sides. Use that tension to stretch gently down the backs of your legs.

4 Warm up your ankles and stretch the fronts and sides of your lower leg before you put your boots on. In a standing position, using a curtsy like motion, point the toes of the rear foot (toe nails pressed to the floor and sole of the foot facing upwards), gently bend both knees and lower into the curtsy until you feel the stretch. Repeat on the other leg.

Pictures by Shutter Bugz Photography, Alamy and Rebecca Davies Photography

the rider respectively, on every stride."

There are some common indicators that a rider's position might be affecting their horse's way of going.

"Lack of forward impulsion, the horse 'putting the hand brake on', falling in or out," Sarah explains, "being on three tracks when you're trying to ride straight, the horse 'ignoring' your aids, as the aids are confused, among others."

THE physical performance of rider and horse is so interconnected it can be difficult to work out the root cause, and this is where riding simulators come in. Jennifer started using one about three years ago, to help a client who'd had knee surgery.

"Simulators are amazing for riders, especially the motor-generated ones," she says. "You can press the button and go into walk, trot, and canter. The rider has real-time feedback on the screen from different sensors so they can see that their weight is to the right or their right leg is on and they didn't feel it."

Other new technology includes saddle pressure sensors and AI analysis but, as Jane points out, data is only as good as the rider's understanding of it.

"With some of the apps you get the information but not the support," she says. "You need a coach or expert to help you interpret it."

And, of course, to help you improve.

"If someone has told you that you are crooked when you ride, don't despair," reassures Clare. "Many elite riders are wonky and some can ride better than they walk. The aim is to identify which areas are problematic, which of these can be improved, and if they can't be changed, then we find the best way to accommodate the issue."

OFTEN the best way to improve rider biomechanics is with non-ridden exercise.

"Find time to work on yourself, even 10 minutes before you get on; you'll have a better schooling session for it," says Jennifer. "People often have jobs that involve sitting or driving. If you're sitting a certain way, you'll bring that when you get in the saddle. Even yard duties – if you carry a bucket, do it on both sides."

Non-ridden exercise is particularly beneficial when it's tailored to the demands of our sport.

"A standard plank is often used as a measure of strength and endurance," says Clare. "But it makes more sense as a horse rider if you can incorporate a plank into a dynamic exercise. Can you support your elbows on a gym ball while in the plank?

"There are many physios and conditioning coaches who are good at assessing rider biomechanics – you need someone who is familiar with riding and what it involves," she adds. "Equally if you have pain or a medical condition then always check with your doctor first."

Investing time and effort in improving rider biomechanics can have a multitude of rewards, for horse and rider.

"Riding becomes less fatiguing, there's less overload, for example resulting in reduced back pain after a long hack," says Jennifer. "Being better balanced, more symmetrical, you then give clearer and more consistent aids to the horse and so take the confusion out of it for them."

What we do off the horse has an effect – alternate sides when carrying a bucket

Jane agrees. "If your position is poor and biomechanics not ideal you can confuse the signal you're giving to the horse. If you are trying to balance yourself, that has an impact on your horse and your safety."

She points to a survey she conducted with Dr David Marlin, which asked people to self-report on the circumstances of their last fall.

"Most falls happened out hacking or on the flat and were associated with a sudden change of direction in the horse – a spook. The riders tended to fall off over the shoulder. We've inferred that's about rider balance."

And the good news is that improving your rider biomechanics can be quite a subtle process.

"Small changes can bring big rewards," says Clare. "Horse riding, whether professionally or for leisure, works beautifully with the 1% rule."

A key message from biomechanics is that rider fitness is just as important as our horses'.

"Riders always tell me about the regular physio visits their horse gets but they're walking with a limp! You're 50% of that relationship," says Jennifer. "Taking yourself away from the horse and focusing on yourself will benefit you both." **H&H**

A rider's perspective

"WELCOME to Fred's stable!" jokes Tamsin Tarr, of Classical Rider Training UK. Fred is a mechanical horse, his "stable" is Tamsin's gym – and this was my first-ever experience of rider biomechanics (pictured).

I hopped on Fred and the first thing Tamsin noticed was that my lower leg was too far forward.

"That's drawing attention to where you've got tightness," she explained. "That's what we need to tackle."

The other thing she picked up was my upper body position.

"Think of your chest as the car headlights," she said. "You've got them on full beam, you're pushing your chest forward, which is making your back tense. If you 'dip the beam', your back and shoulders will soften."

I realised that when I ride, I'm trying so hard to "correct" my hunched shoulders from working at a laptop, that I'm making myself tight elsewhere. Tamsin explained that I've been using that "tightness" to balance. Softening there means I have to use my core instead.

Tamsin then demonstrated four stretches (box, p55) that I can do before riding to help improve my position and balance.

The next day, I put what I'd learnt into practice. I did the stretches before I got on and while riding, I was mindful of adjusting my lower leg position by rolling my thigh, as Tamsin had demonstrated. This engaged my core and meant I was able to soften my shoulders rather than tensing my back. I had to keep adjusting throughout but every time I did, I felt more comfortable and balanced.

Pictures by Rebecca Davies Photography and Alamy