Part 1

Biomechanics

Horses Inside Out

Gillian Higgins

Story: Anna Sharpley.
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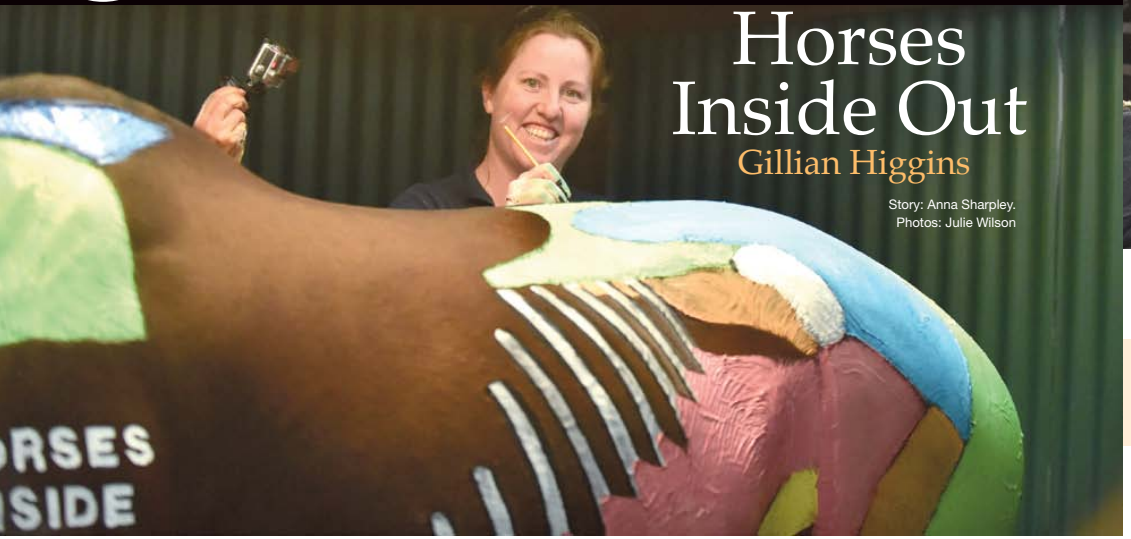
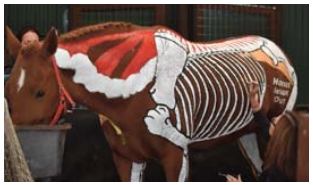


Before the presentation, Gillian spent many hours painting the horses. Fortunately she had helpers, as was the custom with the great masters who delegated work to their students. The paint used is water based, non toxic and completely harmless.



This article is the first is a series of three relating to the physical welfare of your horse. This month we briefly touch on the visit to Australia of Horses Inside Out founder, Gillian Higgins and we move on to Massage and Saddle Fitting in the following months.

On a cold autumn night at **Leanne Williams's** Avoca Park in Macclesfield, Victoria, we attended an illuminating and entertaining presentation by Gillian Higgins from the UK. "Gillian is an equine and human sports remedial therapist, British Horse Society Senior Coach, author and event rider with a passion for equine anatomy and anatomical art. As an expert in her field, she founded Horses Inside Out. This unique organisation where the horse's skeletal and anatomical structure is painted on the outside of the horse, gives riders, trainers, students and therapists a fascinating insight into the training, management, comfort and wellbeing of their horses through understanding anatomy, physiology and biomechanics."* Add to that list of accomplishments, artist, as Gillian takes between six and eight hours to reproduce the internal structures colourfully on the outside.

Biomechanics is basically the study of the mechanical laws relating to the movement of structure of living organisms. For instance, the biomechanics of a Quarter Horse does not lend itself to running in the Melbourne Cup, despite it being a horse. It may run the 3,200 metres, but it has no chance against horses that are far more biomechanically suited to that activity. If we know how something works, will we take greater care of its component parts? For most of us the answer is yes. We service our cars, change the oil, get new tyres when necessary etc. We know that will extend the life of the vehicle and it will perform better. What Gillian Higgins is doing is educating us about how a horse is built and how it functions best for both its welfare and our enjoyment of it. Despite many years involved with horses most of us are ignorant for the most part, save for the rudimentary points of the horse we learn in Pony Club or as part of some low level coaching qualifications. We are ignorant of how a horse works, as we continue to practise activities both on and off the horse that are detrimental to its wellbeing.

"Horses are not designed to be ridden"

We didn't get his name. Although he has seen better days, he was an interesting and invaluable tool in explaining how a horse works.

"A horse's back is not designed to carry weight", explains Gillian. "The saddle sits in front of the painted line."

"Working muscles in a fixed position for too long will create tension"

"It's not just about the anatomy and muscles, it is about how we apply it to riding", begins Higgins. Gillian is not just about theory, she wants to ride and she wants us to get the best out of our horses. Her opening statement, "horses are not designed to be ridden" set the scene for an interesting and entertaining evening. There was audience participation and Higgins proceeded with intelligence and humour. We were given a lot of information and it would be impossible to remember it all, but there would not have been one person who left not enlightened in some way.

With the help of equine models, Leanne Williams's dressage horse, Avoca Solomon and Paul Buckland's Two Star eventer, Forest, Higgins explained that the "horse's back was not designed to carry the weight of a rider, it was designed to carry its own weight. As soon as we sit on their backs, we alter their posture, their balance and their ability to move." How we compensate for that is to strengthen the back. "Working a horse with its head down is beneficial for back support and it is important to feed a horse off the ground and not up in a hay net. The stronger its back, the better it can support us. Whilst a horse can carry 20% of its body weight – to reduce the burden, it is important to perform exercises both on and off the horse and pay attention to personal fitness, weight, posture, reactions and balance."

The discussion went on to the various parts of the back that affect movement, for better and for worse, such as the Lumbo-Sacral Junction (the Sacroiliac joint behind the saddle) which is a "huge joint that enables the hind legs

"As soon as we sit on a horse, we alter his posture, his balance and his ability to move. The horse supports its anatomical posture by 1, position and movement of the neck, 2, position of the hind leg, 3 position of the forelimbs and 4, muscles (the balance of flexor and extensor muscles).

Leanne Williams with her dressage horse, Avoca Solomon ready for the presentation. The Extensor Chain of muscles, extending from the neck to the tail are painted in blue and the Flexor Chain is painted in orange, yellow and red.

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to tilt the pelvis and bring its back legs under. With the hind legs well under the horse the back posture is better and more round. As soon as we get on a horse it is important to get the hind legs under and the neck down. Even on a day off work and we are just walking out, it is important to get the back legs underneath. The abdominal muscles of the horse hold the rider's weight by lifting the back.

"There are 700 muscles in a horse's body consisting of Extensor and Flexor muscles and these chains of muscles must be balanced. The Flexor muscles are used as the hind limb comes under the horse and the Extensor as it pushes off from behind and the abdominal muscles contract as the hind legs come under the body. The canter is the only gait where we see Flexion and Extension at the same time."

We were advised that working muscles in a fixed position for too long will create tension and when asking for something new, only ask for a short time. Work in a fixed position (lunging or riding in an overbent position) for a long time can create resistance and unsoundness. Think of your own vulnerability to muscle strain in a workout. If we do it for too long we can injure ourselves. We need a fitness trainer to advise us what to do and for how long and we need to think of ourselves as personal trainers for our horses. We need to work the horse in a way that uses all the joints and muscles incorporating, trot poles, cantering poles and backing up etc., and for stabled horses, "passive joint mobilisation" (physio) is encouraged.

"Theory goes in tandem with good training methods," says Higgins. "We want the horse to be up in the back and at the base of the neck to carry itself and you."

This brief article barely touches on the avalanche of information imparted on the night and greater study on the subject is encouraged. www.HorsesInsideOut.com

**Introduction. Posture and Performance. Principles of Training Horses from the Anatomical Perspective. By Gillian Higgins with Stephanie Martin*

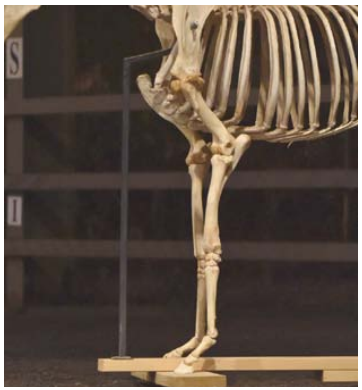
Gillian compares the seven neck vertebrae with the painted version on the horse. "Most movement occurs at the base of the neck, followed by the head and second and third vertebrae."

This is a demonstration to show how the position of the neck affects the back. In this photo the neck is up and the back hollows.

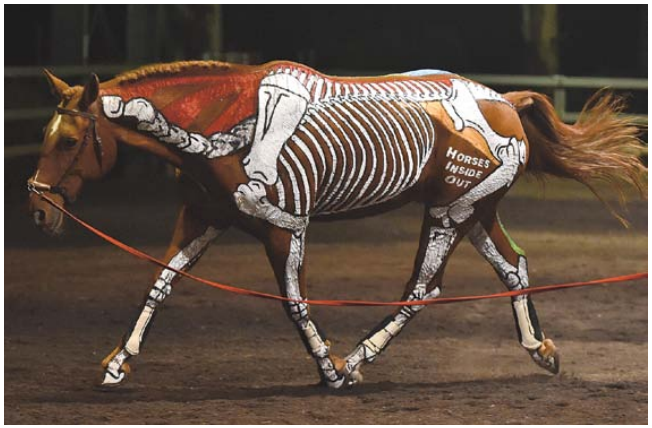
If you compare this photo with the one where the horse's neck is up you can see that with the head and neck down the back is up and rounder.

"The movement of the ribs contributes to the horse's ability to bend. Ribs on the inside of the bend come closer together.

"Ribs on the outside of the bend are further apart and bulge to the outside."



"Unlike humans, a horse's forelimbs are not attached to the skeleton by bone, but by a group of muscles collectively called the Thoracic Sling. These muscles help with collection and extension of the forelimbs and if a horse is constantly ridden on the forehand these muscles may become painful. It has been associated with horses being "girthy".



"In the trot, there is a moment of suspension, as the horse springs from one diagonal to the other."

Gillian shows how the pelvis fits into the Lumbo-Sacral Junction (the Sacroiliac joint). "This joint is not designed to move, its function is to transfer power from the hind legs forward by tilting the pelvis and bringing the back legs under. There are five angles in the hind limb and therefore five opportunities to compress and spring forward. It all comes from the Sacroiliac joint which is a common cause of hind leg issues."

"The canter is the only gait where we see flexion and extension at the same time."