

The outside of a horse is good for the inside of man. So goes the old saying.

In our last issue, we featured Equine Body Worker Carolyn Kutchyera of Backstretch Equine and Canine Massage as she described what the horse has under its skin and how it all connects. Her model was Guinness, an eight year old dressage horse who was painted to depict superficial and deep muscles, and the bony landmarks. This time, Carolyn introduces Kiefer, a twenty-six year old thoroughbred showing the deep muscle layer and bony landmarks.

Having a basic understanding of how your horse moves, and knowing what is normal for your horse will help a rider to detect and address muscular issues as they begin to develop, before a small issue is allowed to bloom into a full fledged lameness. In this article we'll take a brief introductory look at functional anatomy, what muscles come into play in locomotion, and what to look for when you sense something is not quite right.

There are several types of muscles in the body, such as those that are involuntary like those involved in cardiac function, respiratory, and digestive systems. For our purposes here, we are concerned with the skeletal muscles, which are under conscious control. These muscles provide the means for movement to occur.

The job of skeletal muscles is to effect movement and stability. In locomotion, which is what most of us are interested in when becoming partners with our horses, the muscles are attached to bones (via tendons) across joints, and cause the bones to move, or to brace against external pressure. These muscle groups work in pairs – one set contracts to close the angle of a joint, the opposing set relaxes to allow that joint to close, then

they reverse roles to open the joint up again – resulting in movement. Flexors close the joint, extensors open the joint.

Mechanically, the muscles are able to contract and relax (shorten and lengthen) by the action of muscle fibres. In a nutshell, these micro fibres will slide against each other or pull out end to end to shorten or lengthen the muscle. When these fibres are not able to move freely, either by injury, a knot, or chemical issue, they can prevent the affected muscle from either contracting all the way, or relaxing all the way. As this problem progresses, what you see is possibly a shortened stride or limited movement in one direction – one of the sets of muscle groups is not able to do its job. Massage and stretching can often help to relieve these restrictions, returning the muscle to its normal range of motion.

It is not only muscles that can cause

a restriction in movement. The fascia is a very strong fibrous connective tissue that exists throughout the entire body. It covers all the organs, each muscle, muscle fibre, and cells throughout the entire body. One of the layers extends uninterrupted from top to toe (or poll to hoof)! If you have prepared a piece of raw chicken, you will have encountered fascia – the thin strong membrane between the skin and the muscle. If you think of this as a knit bodysuit, a pull in the threads at one point will effect the lay of the stitches throughout the entire structure. Fascia responds in the same manner. A knot, adhesion, or scar in one area can cause a restriction at the other end of the body as the fascia stretches to accommodate the disruption.

One of the tools available to you to pinpoint areas and identify muscle groups is to use the bony landmarks, and do comparative anatomy with

yourself. Though we are bipeds and horses are quadrupeds, there is a great similarity of structure. If you can identify the areas in yourself, you can begin to understand which muscle groups are engaged in your horse's movement. While many more muscles come into play in movement than described here, the labelled photo of Kiefer is a broad overview, and will begin to direct your eye to which general muscle regions effect which movement. This is not intended as a comprehensive guide – ask your vet and refer to an anatomy publication for detailed information. Try to engage the same muscles listed below in yourself to compare.

Beginning at the head and neck, here is a general listing of the bony landmarks and some of the muscles and functions that relate to them.

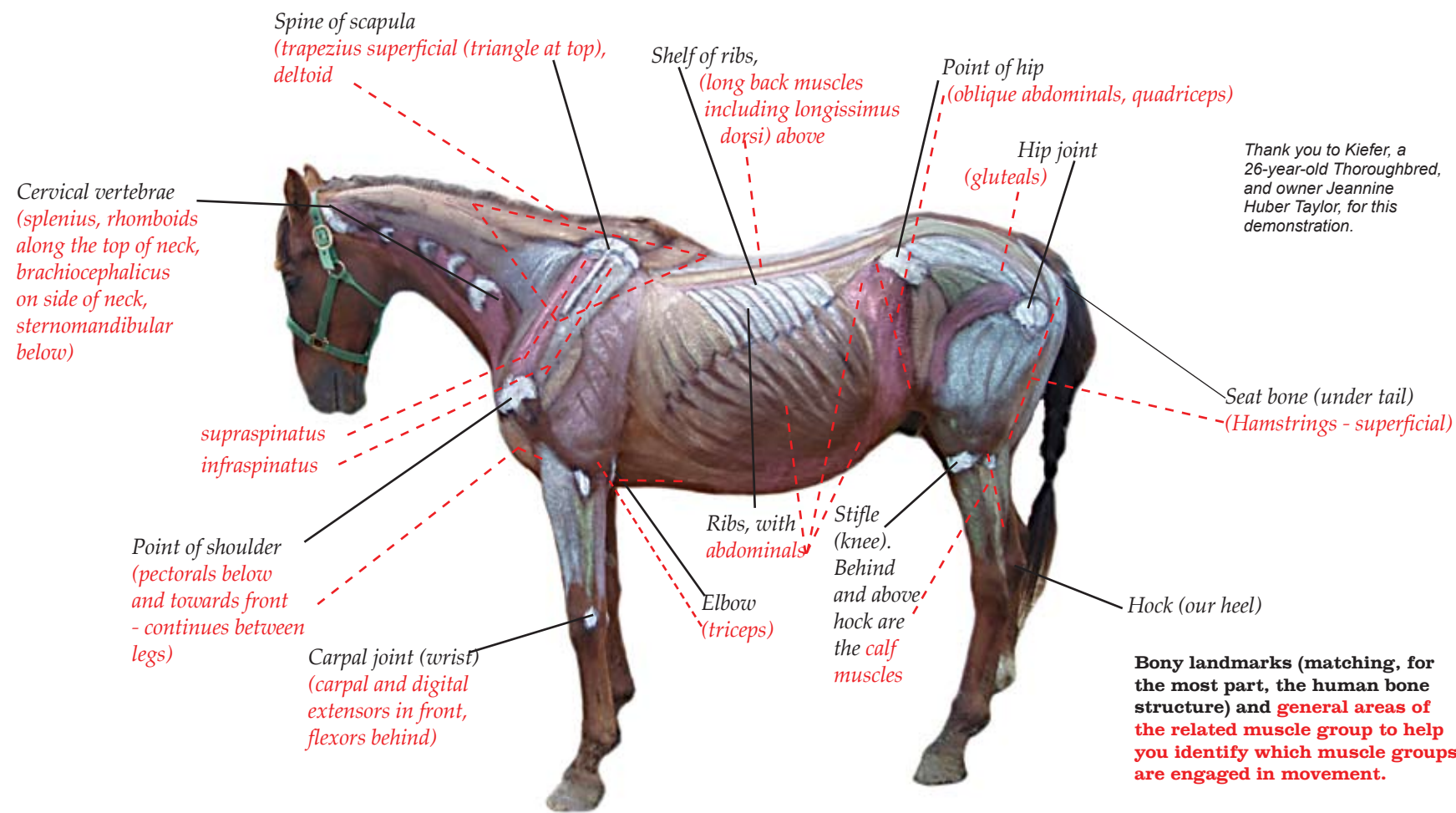
Cervical vertebrae: the splenius and rhomboids above the vertebrae

elevate the head and neck; the brachiocephalicus on the side bends the neck laterally, extends the shoulder; the sternomandibular below flexes the head and neck when both sides are engaged, inclines head and neck when only one side is engaged.

Point of shoulder: the brachialis flexes the elbow, biceps brachii extends the shoulder and carpal joints, flexes the elbow. The pectorals draw the forelimb back, forward and adducts (there are several pectoral muscles).

Spine of scapula: the trapezius triangle (superficial muscle not painted here) moves the scapula forward, backward, and the shoulder upward; supraspinatus extends the shoulder; infraspinatus abducts and rotates the arm laterally; deltoid flexes the shoulder joint.

Elbow: The triceps brachii flex the shoulder and extend the elbow.



Carpal joint (our wrist): extensors in front extend the carpal and fetlock joints (our fingers); flexors behind bend these joints.

Shelf of ribs: above are the long back muscles which when contracted, extend the back (arching downward), and when relaxed, allow for the back to flex (rounded), effect lateral bending. (also see Ribs: abdominals).

Ribs: the abdominals cover a large area over, below and behind the ribs. Abdominals contract to flex the spine (which relaxes and lengthens the topline, which in turn allows the neck to come down) – very important in collection and allowing the hind end to engage. Contract your own abs and feel how it tucks your pelvis in – this is as important in horses as it is in humans for core strength and stability.

Point of hip: abdominal obliques, as described above, plus bends the trunk; below the point are the quadriceps which extend the stifle, and contribute to flexing the hip.

Hip joint: associated with the gluteals which extend the hip, flexes and abducts the limb.

Seatbone (under the tail): hamstrings along back of leg extend the hip and hock joints, and flex the stifle (when the hock is flexed).

Stifle (our knee): (see point of hip for quadriceps); behind and above the hock is the calf muscle (gastrocnemius). This extends the hock and flexes the stifle, but cannot do these at the same time.

Hock: (equivalent to our heel) Calf muscle is above, below is the Achilles tendon (digital flexor tendons, also found in front leg below carpal joint).

It is also very important to pay close attention to your saddle fit and placement. An ill fitting saddle, or one placed too far forward will create pressure points, and inhibit the muscle contraction and extension needed for movement, especially those of the

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shoulder and back muscles. Too far back places the saddle where there is no support in the lumbar region. Check with a saddle fitter regularly as your horse's musculature will change with fitness level, nutrition, general health, and age.

A horse is a prey animal, and by that nature, will attempt to hide any weakness that could make them a target for a predator. By the time you see an issue, you can be pretty sure that it has been developing for a while (barring acute trauma). On that note, humans are classified as predators, and because of that, we are hard wired to notice any weaknesses. Of course we don't use this system in a predatory sense anymore, in fact we're barely aware of it, but you can use it to your advantage. If you think your horse is slightly off, trust your eye. You may not be able to pinpoint what or where the issue is, but the fact that you suspect something is wrong is enough to act on. Trust your senses – they're hardwired in us.

If a horse has an issue, a restriction of some sort that prevents it from moving all parts of the body in balance and efficiently, it will enlist another part of the body to work double time in order to compensate for the weakness. With the limbs, the general pattern is to compensate diagonally. For example, if there is a problem with the front left leg, the hind right will take up the slack to allow the horse to keep on the move. Once this has been going on for some time, the hind right becomes fatigued and may develop an issue, and another limb will be called upon to compensate for that. The cycle continues until it becomes very difficult to determine the original cause of the issue. One has to peel off the layers of compensatory issues to get to the root, and as many of us know, that sometimes becomes nearly impossible.

The best plan is to be very observant of your horse, and to know what is "normal". Early detection of small issues can short circuit the whole process of compensatory issues. If you pay close attention to changes with your eyes, your hands, your instinct, and the feel of how the horse moves under saddle, you will be able to detect an issue before it shows, allowing you to take action before the issue becomes serious with stall rest and and high bills! You can refer to the August issue for tips on observing your horse's gaits.

An efficiently moving horse uses all its limbs equally and in balance. The long back muscles allow the horse to bend equally in both directions; the core abdominal muscles are strong and can keep the back elevated and supple. The muscles in general are in good condition, and can extend fully, which allows for more powerful movement – it is the muscle contraction that gives the power to motion. The more it can extend, the more it can contract – any restriction in the range of motion decreases power and strength. A healthy muscle is also able to absorb shock more; it can quickly recover from stumbles, slips, uneven footing.

The most important factor in detecting an issue is to know what is normal for your horse. Spend some time focusing on how they feel, look and move. Detecting any change will be your first step in preventing issues from getting worse. When did the change start? What region did you first notice a restriction? Does your horse warm out of it? Collecting this information can be critical information to record and share with your vet; it will also give you a benchmark to see if it is better or worse the next day (and can help in knowing when to call the vet – hint: the earlier the better!).

In the next issue, we'll look at some stretches you can do at the barn to help maintain your horse's muscle health and flexibility. 🐾

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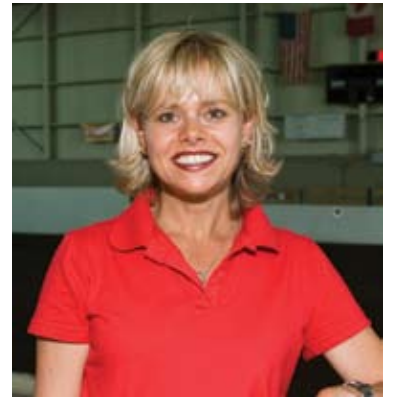
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Quiet those **noisy** hands! More on the topic:



Last time you talked about noisy hands. As a leader for a 4-H group, I see young riders pursuing jumping, gaming and reining without building a solid riding foundation first. I'd like to motivate the riders to spend some time developing the educated hands you were describing.



Training tips from Lindsay Grice.

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It's a challenge, isn't it, to take a step backward and work on the fundamentals? Who wants to think about sports drills when you're already in the game, or learning music theory and scales when you're playing the piano by ear? However, without laying a solid foundation, cracks start to appear later in your horse's behaviour and well being. Three typical ways your horse deals with the noise.

1 Rooting.

This is when a horse opens his mouth and thrusts his head and neck forward, pulling the reins out of the rider's hands. Often the rider gets a jolt as the horse tugs her out of the saddle. It's a horse's frustrated attempt to get some peace from the rein pressure. And it usually works! School horses are quick to learn this trick – the unstable body position of a novice rider makes them easy to unseat.

The fix: Your job is to make absolutely sure your hands are communicating a clear message of signal/response/pressure or release to your horse. If he understands how to find release through yielding to pressure, it might be time to show him his usual escape route is now closed. As soon as you apply pressure, get ready for him to answer with a root. Anchor yourself in the saddle and sharply brace your arm, or even bite back a little with a little snap of your own against his tug, so he feels like he's rooting into a brick wall. The trick is, every time he does this, he must meet with

this result – don't miss one, so be on your guard. He'll soon learn that this behaviour NEVER works.

2 Dull mouth.

As your horse habituates to the pressure he becomes less sensitive. Instead of yielding to light signals, he opens his mouth, crosses his jaw or completely ignores them.

The fix: Is not a bigger bit! If I'm not fluent in Spanish, speaking Spanish with a megaphone won't make me understand. Amplifying the message doesn't help in comprehension. Before heading to the tack room ask yourself: Does my horse completely grasp my system of signal and response/pressure and release? Am I delivering the message skillfully? Only if the answer is yes to both of these questions, should you consider a different bit. Moving from a snaffle to a curb or leverage bit, for instance is a logical progression in a horse's education. But because the leverage bit will magnify the movements of your hands, make sure the skill level of both you and your horse is ready for the change.

3 Head tossing.

This is an frantic attempt to get away from erratic rein signals. It usually works because a horse gains some slack in the reins, even for a moment, as he elevates his head. It's similar to a drowning person

HOW MUCH CONTACT?

While there is general agreement that the solution to a light mouth is not loose, skipping rope reins, the word contact can stir up strong opinions among various equine disciplines. Extremes range from the western pleasure drape to the white knuckled grip of some dressage or jumping riders. Contact, or soft contact is the standard set out in most association rule books.

In a snaffle or non-leverage type bit, the horse can recognize a release even without a slack in the reins. A good goal is for the rider to maintain only enough pressure to keep a straight rein line. On a scale of 1 – 10, the pressure he'll feel in his mouth might register a ½. Picture the reins attached by a single thread. This is only achievable by developing a fluid, following arm and a strong position in the saddle in order not to telegraph inconsistent signals down the reins.

With a curb or leverage bit, the release has to be more pronounced, registering a zero on the scale. For each correct response to a turn, flex or slow signal, make sure the shanks return to neutral and the curb chain is applying no pressure on under the chin. You will see a visible limpness in the rein.

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