DYNAMIC HORSE SOLUTIONS · CLINIC WORKBOOK

The Hind End Junction

Biomechanics & Posture

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1 Importance of Human Posture on Equine Mechanics

Horses are sensitive prey animals that are affected by every interaction we have with them. We find connection with the horse through neutral contact, which is a constant cycle of rebalancing.

Humans connect to horses on the ground through the rope, halter, use of their torso and upper body. The goal is to not create additional brace in the horse, which we can achieve when our own posture is in a neutral pelvis.

What is a neutral pelvis?

A balanced mid-point position of the pelvic bones where the pelvis is neither tilted forward (anterior tilt) nor backwards (posterior tilt). This can occur when static (not moving), moving, or sitting (especially significant when riding!).

✎ Your notes

2 Hind End Musculoskeletal Anatomy

We are going to concentrate on the bones of the ilium/pelvis, sacrum and lumbar spine; the sacroiliac joints (2), lumbo-sacral joint, and hip joint.

There are many important muscles in the hind end, but for our purposes we are going to concentrate on one in particular: the **medial gluteal muscle**, as it is the main driver for impulsion and lift of the back.

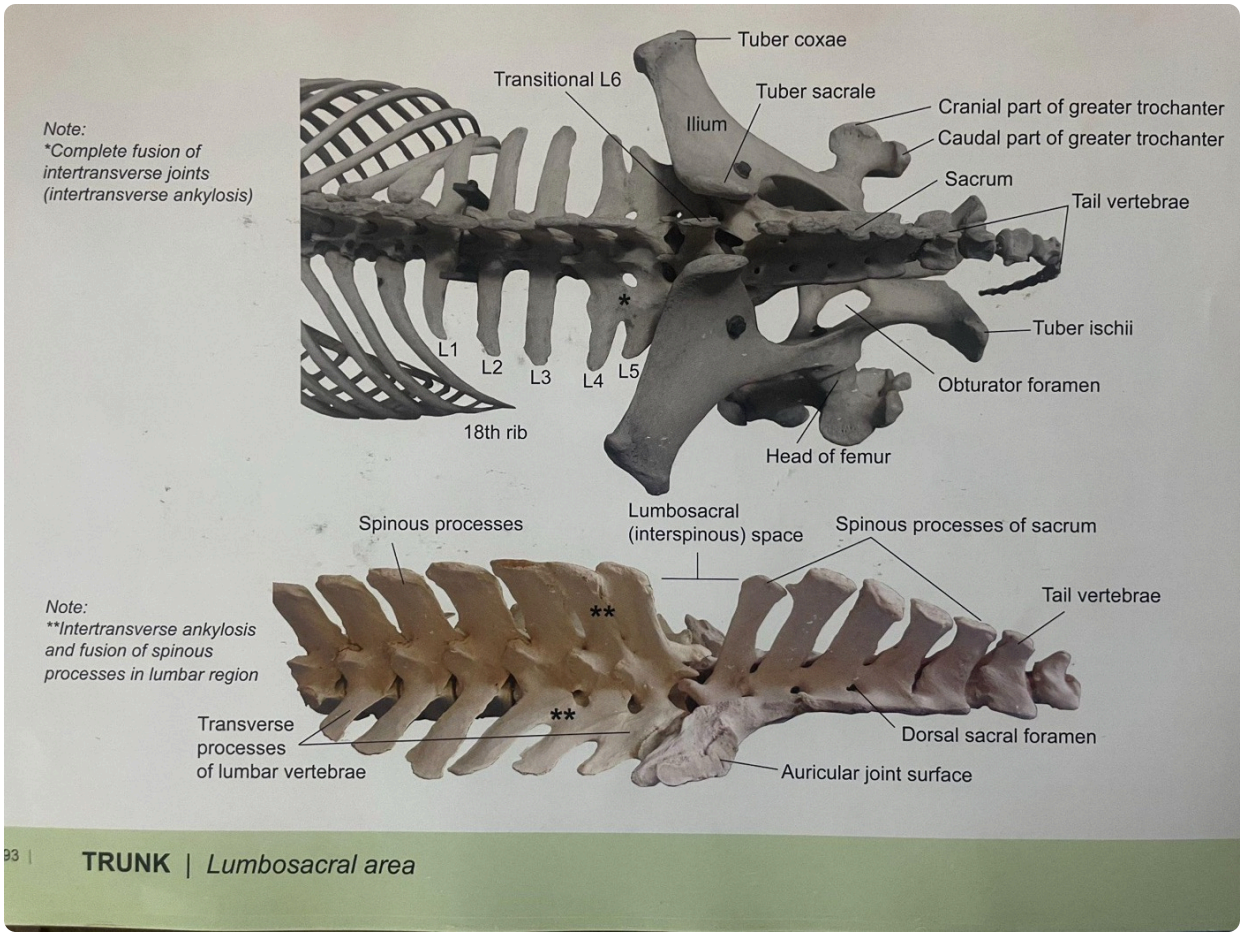


Figure 1

Source: Ruddock-Lange, N. *Atlas of the Equine Musculoskeletal System*, 2nd ed., p. 94

Lumbar spine: Made up of 6 vertebrae with transverse processes.

Sacrum: Triangle-shaped bone of 5 fused vertebrae that make up the last section of the spine and connects to the tail (coccygeal bones).

Lumbo-Sacral Joint: Junction of the last lumbar vertebra (L6) and the sacrum; has the most motion in the lower back and pelvic region!

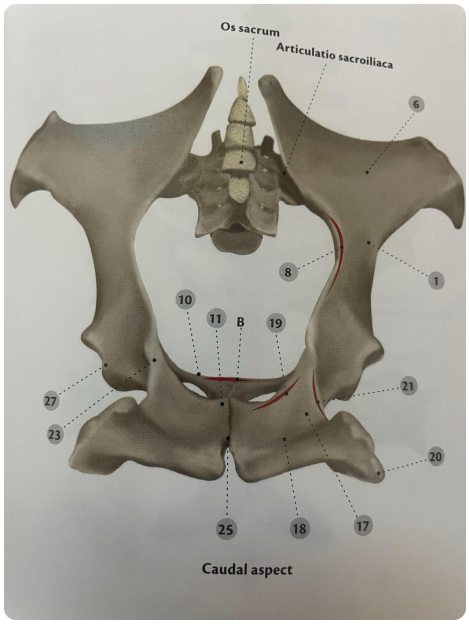


Figure 2
Source: Gronberg, P. *ABC of the Horse, Atlas*, p. 49

Pelvis: Made up of ilium, pubis and ischium. Actually 2 parts (right and left) that join together at a cartilaginous seam on the underside called the pubic symphysis.

Sacroiliac Joints (2): Gliding joints with a joint capsule on each side where the cartilaginous surfaces of the sacrum and pelvis meet.

The pelvis and spine are the last parts of the body to fully fuse, and usually do so around 5 or 6 years of age. Therefore, excessive strain on these structures can lead to SI pain and dysfunction, pelvic instability, poor hind end engagement and lameness.

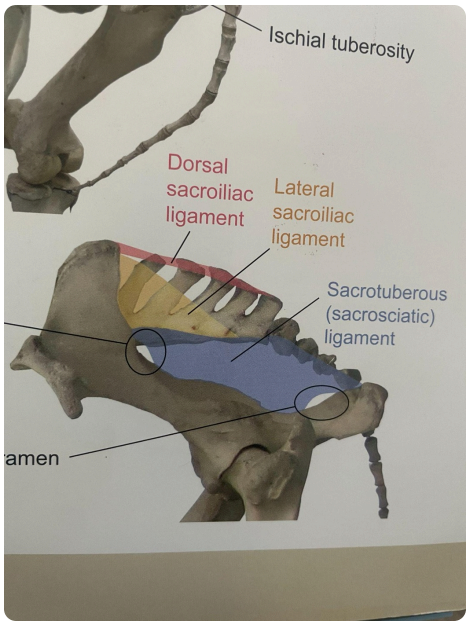


Figure 3

Source: Ruddock-Lange, N. *Atlas of the Equine Musculoskeletal System*, 2nd ed., p. 127

Sacroiliac and Sacrotuberous Ligaments: A network of ligaments that is responsible for the stability of the sacroiliac joints.

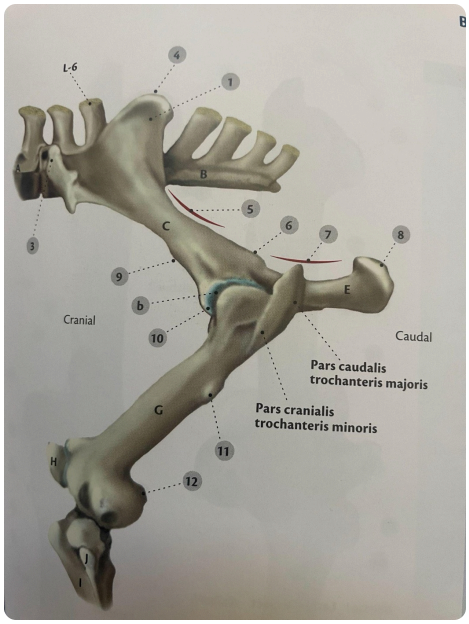


Figure 4

Source: Gronberg, P. *ABC of the Horse, Atlas*, p. 51

Hip Joint: The equine hip joint (or coxofemoral joint) is a deep ball-and-socket joint that connects the horse's hind leg to its pelvis.

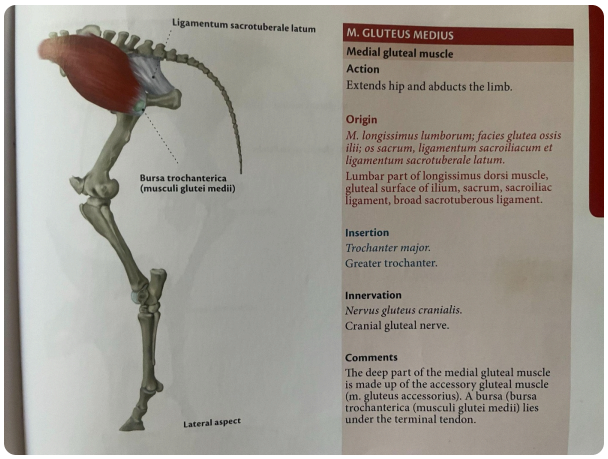


Figure 5

Source: Gronberg, P. *ABC of the Horse, Atlas*, p. 49

Medial Gluteal Muscle: One of the largest and most powerful muscles in the equine body, the medial gluteal extends the hip and is a primary muscle responsible for generating speed and power during locomotion.

✎ Your notes

3 Functional Equine Biomechanics

Horses naturally load more weight on the front end than the hind end. Excessive loading here, and especially when weight bearing (carrying a rider), can give way to an inverted (bad banana) posture that can over time lead to dysfunction and injury. That is why it is so important for the horse to be in a weight bearing posture.

What is a weight bearing posture in the horse?

Distributing more of the weight bearing load to the hind, leading to better posture and quality movement that enables the horse to functionally carry the weight of a rider.

Not one muscle in the horse's body functions to carry additional weight. Horses do far better in terms of how they are made when asked to pull weight (ex: cart or carriage) as opposed to carrying it. Think of a weight bearing posture as the most efficient way to organize the horse's body to do a task that it was not naturally designed to do. A weight bearing posture allows the horse to "come through" which refers to the motion of the horse when the hind legs are creating enough energy to stretch the horse's topline and create a balanced, forward-moving stride.

Note: This is a process and they are not able to hold this type of ideal posture for very long, especially in the beginning. Moving in this way asks for constant rebalancing and connection on the part of the human.

Benefits of a weight bearing posture for the horse

- ✓ Less pain and stiffness
- ✓ Less brace in the horse's nervous system and body
- ✓ Reduced possibility of injury
- ✓ Decreased wear and tear over time
- ✓ Happier, more agreeable horse!
- ✓ Improved quality of movement

✎ Your notes

4 Stability, Mobility, Strength...

1. **Stability.** We find stability through a weight bearing posture. This also is contingent upon the absence of injuries, acute traumas, major pathologies or structural changes that would affect the integrity of the horse's body.
2. **Mobility** (range of motion) may or may not be sufficiently restored through connected groundwork and a weight bearing posture alone, as many horses have accumulated stress and tension over time that has restricted their bodies to the point where they may need additional help through bodywork or other therapies. However, this approach is like physical therapy in that many times what causes us pain and discomfort is the bad posture itself. Sometimes what at first glance appears "off" is just dysfunctional posture, and the horse will actually find ease and comfort in a weight bearing posture, as well as improved quality of movement.
3. **Strength.** Only after we have attained stability and are able to move in a functional way, can we build strength. This means that the horse can learn to hold a weight bearing posture for longer periods of time, as well as building up the muscles that support that posture in motion.

✎ Your notes

5 The Butt, the Bullwhip and the Springboard

The flick of the wrist activates a forward thrust of energy that moves like a wave through a bullwhip. The spine has natural (morphological) curves that function in the same way, as a medium for forward kinetic motion. When the horse correctly uses his medial gluteal muscles to push off from the ground and impulse forward (in a weight bearing posture), a chain reaction of energy transference occurs from the hips to the lower back through the rest of the spine, which will naturally lift the back!

> *“The motions of the limbs are not only guided and caused through activity of the muscles of the limbs, but in a certain amount through the curves and wave-motions of the spine.”*
>
> Janek Vluggen, EDO, D.O., MRO

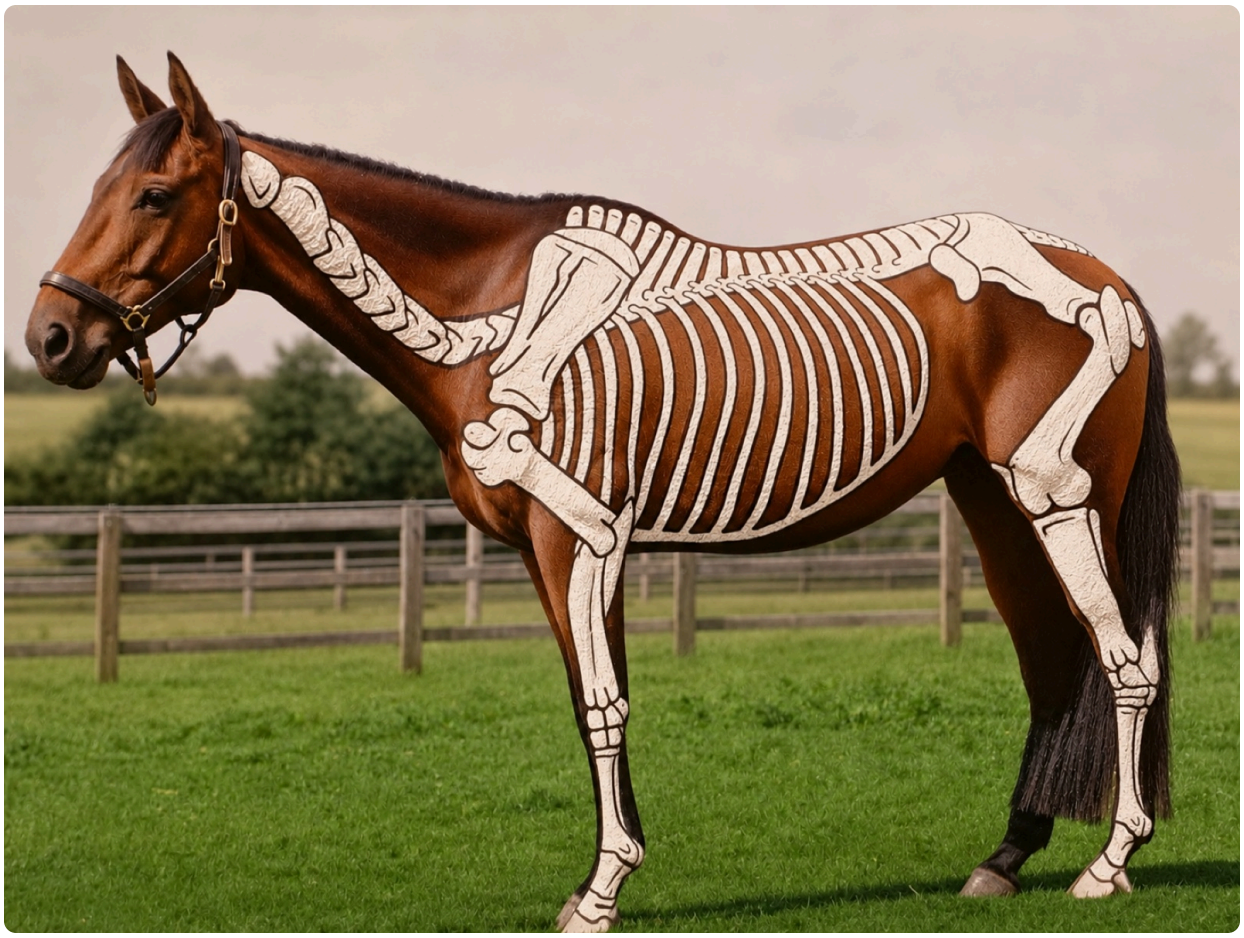


Figure 6
Source: Higgins, G. *Horses Inside Out: Poster Book*.

Key takeaway

Many schools of thought say that the abdominal and core muscles are what lift the back (along with the support of the deeper postural muscles of the spine), and although they flex the spine (open the spaces on the top of the vertebrae), they do not ELEVATE the back.

Another way to think of this is how a diving board can be used by a diver to create spring and suspension. The combination of the bullwhip and the springboard analogies is useful to understand how the horse can propel forwards from their butts and upwards in their backs.

✎ Your notes and questions

References, Acknowledgments & Further Reading

The concepts, exercises, and educational material presented in this workbook draw upon a variety of sources, methodologies, and professional training experiences, including:

- Peggy Cummings — Connected Riding® and Connected Groundwork
- The Masterson Method® — Integrated Equine Performance Bodywork
- The Vluggen Institute — Equine Osteopathy and Education

References & Further Reading

For those interested in further exploring equine biomechanics, movement, bodywork, and osteopathic principles, the following resources are recommended:

- Cummings, P., & Lieberman, B. J. (2011). *Connect with Your Horse from the Ground Up: Transform the Way You See, Feel, and Ride with a Whole New Kind of Groundwork.* Trafalgar Square Books.
- Ruddock-Lange, N. *Atlas of the Equine Musculoskeletal System* (2nd ed.).
- Grönberg, P. *ABC of the Horse: Atlas*.
- Higgins, G. *Horses Inside Out: Poster Book*.