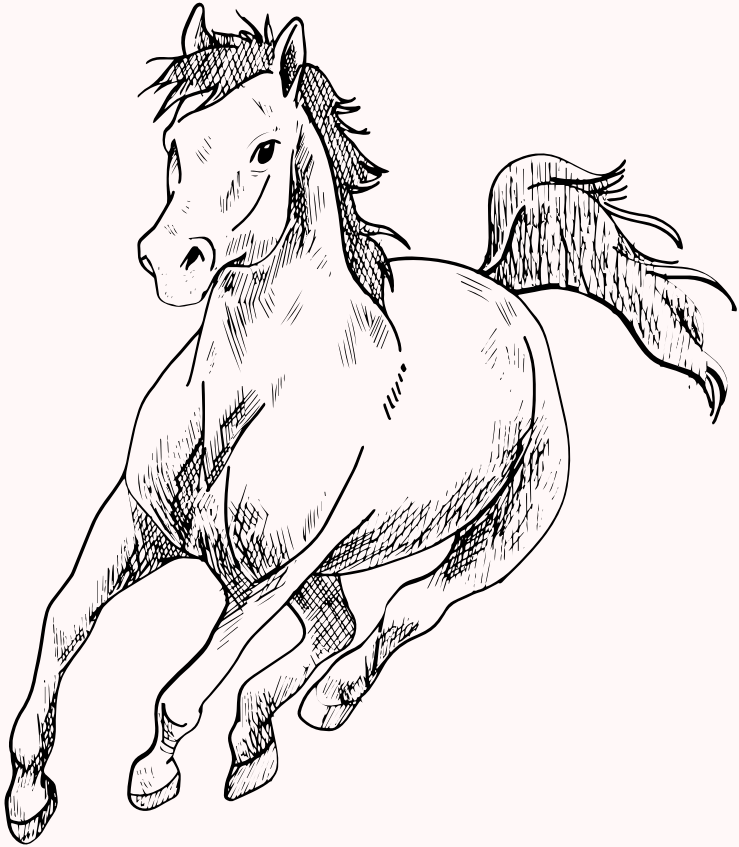


Osteopathic Manipulative Techniques in Equines

A Students Review

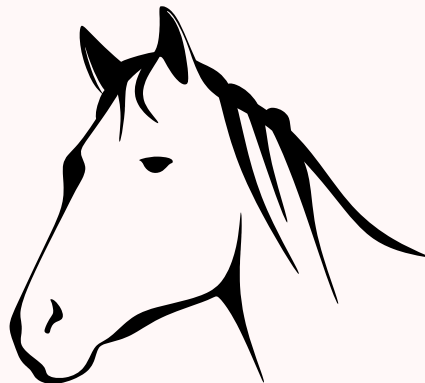


Dinah Arafah OMS-II

*University of the Incarnate Word
School of Osteopathic Medicine*

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Introduction

I knew I wanted to be a Doctor of Osteopathic medicine during my third year of pre-medical studies during undergraduate education. I had always found the concept of a holistic approach to medicine a much more appropriate path to take when considering the human body. After all, how does it make sense to focus on the symptom rather than the patient when we have 'gut feelings' on a daily basis? Therefore, holistic medicine made sense, but I never considered it in animals before.

It wasn't until my precious rescue horse, TC, suddenly went lame (an equine term for unable to walk normally) without cause that I began to consider osteopathic care in equines. When the vet and I did a traditional work up to try and find the cause of his sudden lameness, we, unfortunately, couldn't find anything abnormal. The X-rays and ultrasounds were clear, he was able to pass a walking test on and off depending on the day, and he was too young for injections. At that point, my wonderful vet referred me to his colleague who is a vet with osteopathic emphasis, essentially the equine equivalent of an osteopathic doctor.

Our lives changed that day, he did the equine version of an osteopathic exam and found that his pelvis had been shifted upwards and this was causing the equine version of short leg syndrome. He simply performed HVLA on his right hip and voila! He was running like a maniac within minutes.

Since then I have learned and practiced osteopathic techniques when caring for horses, and it's been even more interesting learning osteopathic techniques for humans and comparing.

This booklet is simply a fun project intended to explore only some of the osteopathic principles seen in the osteopathic care of equines and how it relates to that of human patients. It is, by no means, a comprehensive reference but only an interesting read representing how osteopathic care is not only holistic to the body but also holistic in that it applies to many life forms here on earth. I hope as you go through it, it reminds you of how exciting osteopathic medicine truly is and if a thought along the lines of 'that's pretty cool' flows through your mind, then I've achieved my goal. Enjoy!

What is Equine Osteopathy?

Parallel to human osteopathic medicine, equine osteopathic medicine is also inspired by Dr. A.T. Still and as a result, the goals of equine osteopathic medicine are very similar to human osteopathic medicine.

By translating the science behind Dr. Still's concepts to equines, equine osteopathy provides veterinary physicians the ability to practice care based on the strong connection between anatomical structure, mobility and overall equine health. Equine osteopathic treatment involves manual therapy through a variety of techniques including, but not limited to, myofascial release, high velocity low amplitude (HVLA), muscle energy technique, and much more.

In addition to Dr. AT Still's work, equine osteopathic medicine also uses European osteopathic principles, which focus on finding and treating equine visceral restrictions, flexibility of the neck, and motion of the equine temporomandibular joints (TMJ). The reason for this emphasis is due to the anatomy of the horse, which will be further discussed, but the basic principle is treating any dysfunctions found in these areas helps release many additional somatic dysfunctions in other regions. As an example, a dysfunctional TMJ in a horse will cause him to tilt his head to relieve any pressure and this in turn will cause a somatic dysfunction at the poll, which is where the skull meets the atlas joint. Thus, by treating the TMJ, this compensatory mechanism won't be used by the horse and eliminated.

Finally, there are additional tenets in equine osteopathic medicine that are parallel to what is considered as good physician practice rather than tenets to DOs.

Overall though, osteopathic equine medicine is similar to human osteopathic medicine, the goal is to treat the patient and not the symptom by using holistic approaches and appropriate medicine.

Osteopathic Principles

The American Osteopathic Association defines the goal of D.O. physicians as to promote the body's natural goal of self-healing and returning to homeostasis after an abnormality or challenge of some sort. The tenets of Osteopathic Medicine express this philosophy:



The body is a unit; the person is a unit of body, mind, and spirit.



The body is capable of self-regulation, self-healing, and health maintenance.



Structure and function are reciprocally interrelated.



Rational treatment is based upon an understanding of the basic principles of body unity, self-regulation, and the interrelationship of structure and function.



Respect for the horse through non-invasive treatment and using the body's natural movement to provide care.



Addressing issues and providing preventative care



Understanding and respecting the horse's communication signals.



Providing treatment as gently as possible to prevent a negative experience.

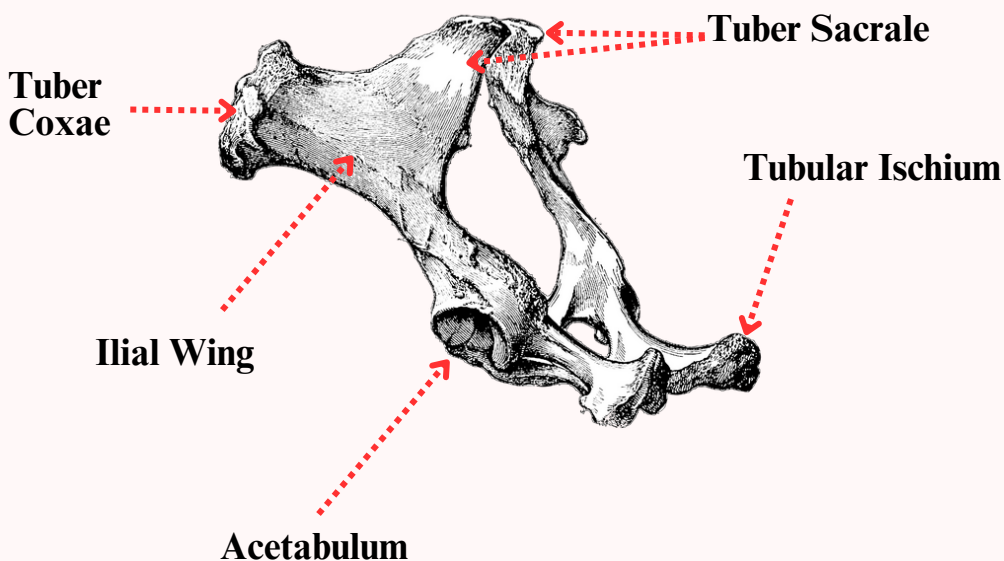
The last four components are of specific importance to treating horses because of their inability to communicate directly to physicians. It is extremely important to pay attention to a horse's body language and the signals it gives to ensure positive and effective treatment.

Anatomy of the Equine Pelvis

The equine pelvis connects the spine to the hind limbs with the help of the sacroiliac joint and massive muscles that are similar to our muscles. These muscles generate massive forces that allow for locomotion of the hind limbs, and the pelvis which together propel the horse forward. Diving into the equine pelvis, it can be divided into 3 zones: 1) the ilium, 2) pubis and 3) the ischium with the left and right hand sides of the

Ilium

The ilium can be found in front of the hip joint, which is a ball and socket joint made up of the acetabulum of the ilium and the femoral head. The ilium's shape extends upwards as well as in front of the hip joint, this forms a broad curved surface called the ilial wings. At the end of each ilial wing, there is a large bony prominence called the tuber coxae, which is essentially the equine version of the ASIS. Finally, superior and posterior to the tuber coxae on the ilium wing, there is a bony prominence called the tuber sacrale, which is the equine version of the PSIS.



Note: This is a diagram of the ilium only.

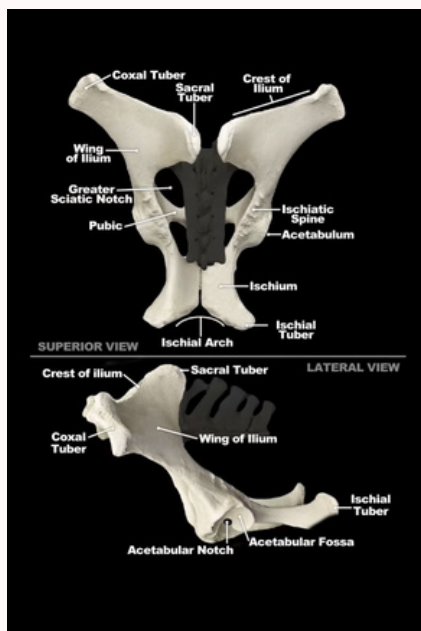
Anatomy of the Equine Pelvis

Pubis and Ischium

The pubis is a flat and triangular shaped bone in the midline of the pelvis. This flat character allows it to provide support to the horse's body weight and assist in maintaining balance in locomotion. It articulates with the ilium to form the acetabulum, which is where the femur bone connects to the pelvis.

The ischium is a robust and elongated bone that also articulates with the pubis and the ilium to help form the hip joint. This bone is adapted to transmit the forces generated by the horse's hind limbs to the vertebral column. This bone also provides multiple attachment points for different muscles, including the muscles involved in hip movement and hind limb function. Finally, ischium has bony prominences called the tubular ischii, and these can be found positioned on either side of the tail of the horse.

Both the pubis and the ischium extend posterior to the hip joint and form the floor of the pelvis before connecting the left and right sides of the ilium via the pubic symphysis. This allows them to provide support the horse's pelvic region and hindquarters.



Note: The sacrum is greyed out in this image

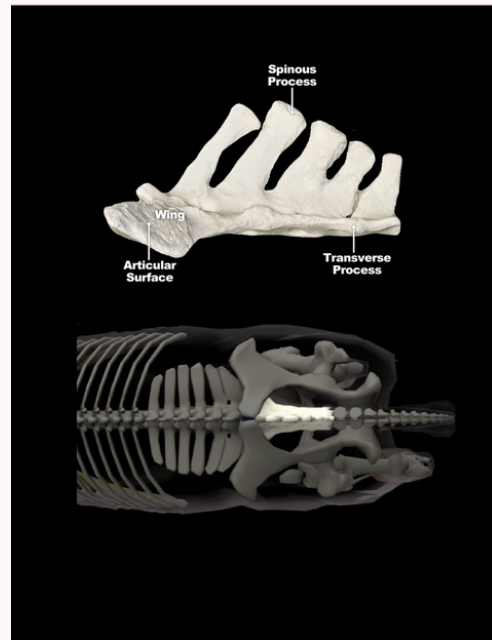
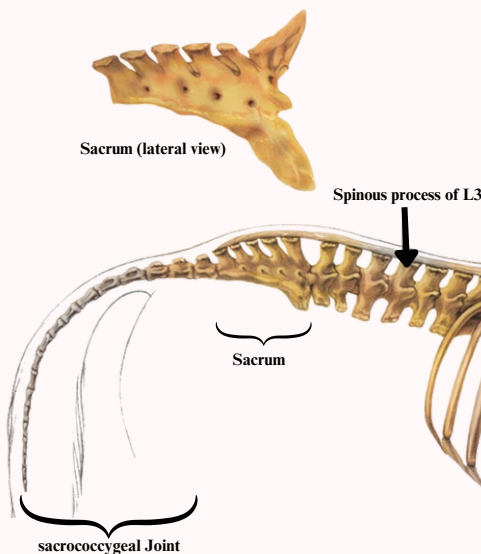
Anatomy of the Equine Pelvis

Sacrum

The sacrum, sometimes called the floating joint, is a triangular shaped bone that attaches to both the pelvis and lumbar spine. It attaches to the pelvis through a synovial joint, and this allows for the pelvis to move and support the horse when he extends or flexes his leg to move. The extent of movement of the SI joint is limited, however, because it's designed for stability and will absorb shock and distribute forces during locomotion.

Additionally, the sacrum is also attaching to the horse's lumbar spine between S1 and L7 on either side, and through the lumbosacral joint which is between the last lumbar vertebrae and first sacral vertebrae. This means that there is a total of 5 joints in a small 2 inch space.

Finally, the sacrum is connected to the caudal vertebrae below it, making the sacrococcygeal joint, and this makes up the tail of the horse. Interestingly, the number of vertebrae of this joint varies between breeds and can range from 15-21 vertebrae. It also consists of cartilage and fibrous tissue, allowing the horse to move his tail.

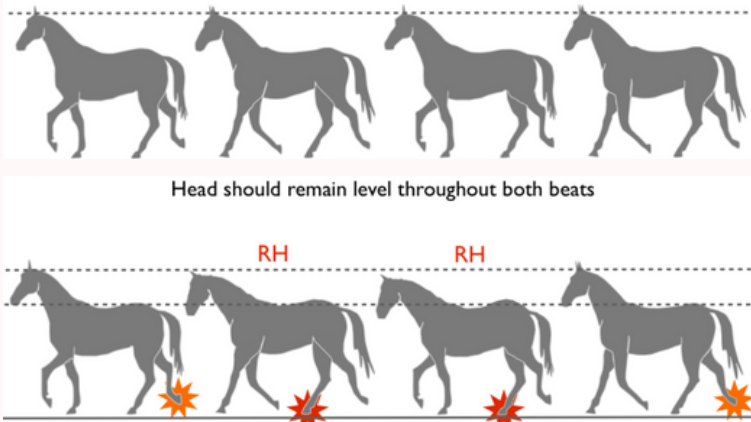


Treating the Equine Pelvis

One of the most common complaints of equestrian's is a lame horse, which in layman's terms means the horse is either not walking well or walking abnormally.

There can be many causes to this, and they can range from genetically acquired joint disease to myofascial distortions. However, a common cause amongst horses of all types and jobs is muscle dysfunction in the sacroiliac joint.

The presentation of a lame equine depends on the cause and degree of lameness. For muscle dysfunction, the horse can present with a limp as he walks, or trots (runs). This can be difficult to see if the limp is minor, however, the majority of limps come with a head bob and so when assessing gait, noticing a head bob and the degree of the head bob can help determine the presence of a limp. Depending on the affected limb, the limp can vary, since this section is discussing the equine pelvis causing the hind limb to be affected the diagram below will focus on this resulting limb.



Additionally, the rider will feel being jolted downwards on a limping horse, similar to the jolt one would feel when falling forward off a horse.

Finally, the equine caretakers will note behavioral changes such as reluctance to move, play, and if uncomfortable enough, reluctance to graze or eat.

Treating the Equine Pelvis

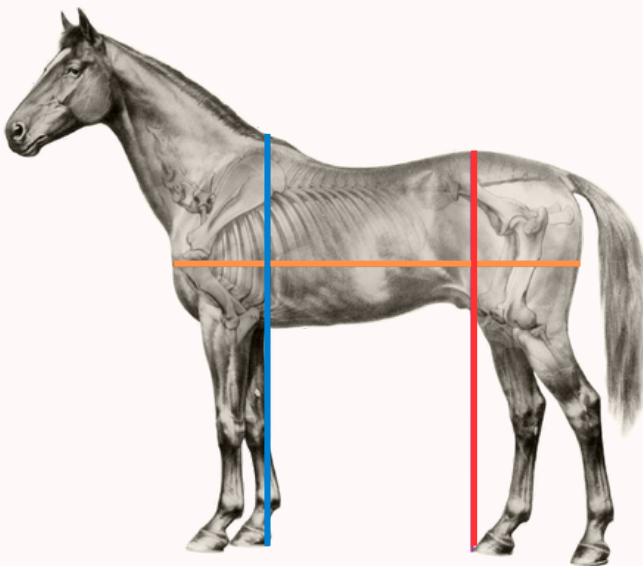
Step 1: Inspection

Similar to treating the human pelvis, inspection is the first step to treat the equine pelvis. Start by placing the horse on a flat and even surface where it is easy to perform a 360 degree inspection safely.

Notice how the horse is standing, a healthy horse without any dysfunction is going to stand evenly with a lowered head indicating relaxation. However, an uncomfortable horse can have his head raised, his back concave and can be compressed in his stance or sprawled out depending on the underlying issue.

Additionally, similar to a plumb line, horses also have multiple imaginary lines used to assess if the horse is balanced. This is important to note as some lameness can be due to a horse being out of balance or vice versa.

- These include the vertical line of the shoulders (blue), the vertical line of the hindquarters (red) and the horizontal line (orange) of the shoulders and hindquarters. This can vary between horses, however the ideal situation is that these lines are straight as opposed to tilted.
- The balanced horse will have perpendicular, straight lines of similar lengths with very little downward/forward tilting.



Treating the Equine Pelvis

Stance (continued)

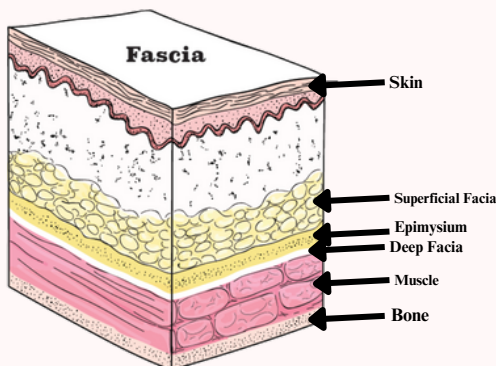
During inspection, take a look at both sides of the horse and note any asymmetries such as a side that is bigger, tilting, and unevenness as this helps confirm the presence of a somatic dysfunction. In regards to sacroiliac joint muscle dysfunction, the dysfunctional side would show an asymmetry through an elevated pelvis as seen by an elevated hind-end.

Finally, the horse should also be inspected from behind at a safe distance, this allows one to visualize any asymmetries that were not noticeable when looking directly at the horse.

Step 2: Palpation

The next step is palpation, this is the best way to detect any TART changes, rotations of the vertebrae, and identify in tightness or soreness. Similar with individuals, when palpating the horse, the pads of the fingers are used, and more pressure is applied to be able to palpate through the different layers including the skin, superficial fascia, deep fascia, epimysium, muscle and then bone.

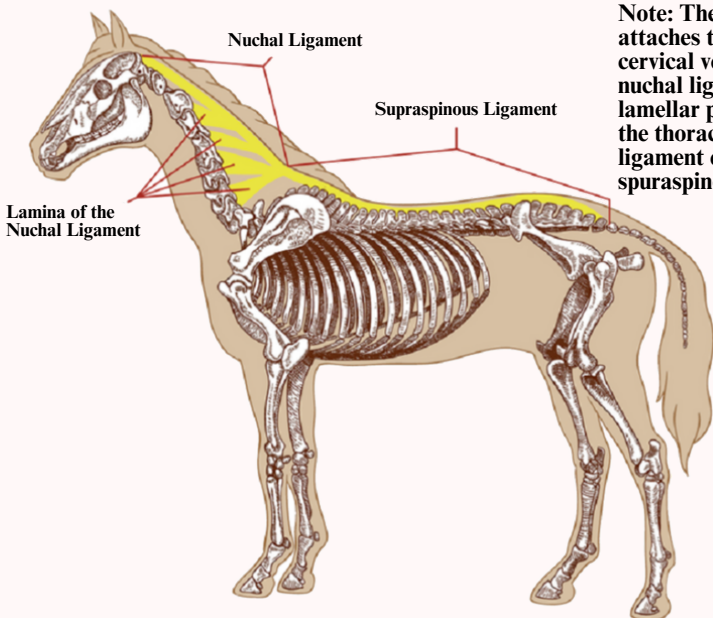
Additionally, when palpating the horse, a full osteopathic structural exam is performed because there will be additional affected areas due to compensation. For example, a horse unable to use his hind limb will be relying on forward limbs to propel him forward resulting in shoulder pain, swelling, and hypertonicity. Finally, just as in people, the fascia in equines is connected as is the entire body, therefore a focused osteopathic exam will only yield a piece of the puzzle, however since this is a booklet, a focused pelvic exam will be discussed.



Treating the Equine Pelvis

To appropriately assess the equine pelvis, the lumbosacral spine needs to also be palpated because the pelvis of the horse articulates with the lumbar spine as well. Other than the Arabian breed of equines, the lumbar spine consists of 6 lumbar vertebrae spaces 2" apart and with no rib attachments. It starts after the 18th thoracic vertebrae at L1, and can be found by finding rib 18 (the last rib), and tracing up to T18. Palpate the spinous process lateral to this costovertebral joint will give spinous process of T18. Finally, palpate one vertebrae lower, and this is the L1 spinous process, to check, compare the transverse processes of T18 and L1 by palpating, the transverse processes of the lumbar vertebrae are wide, and flat.

Begin by gently palpating the spinous processes of L1-L6, by doing so the supraspinous ligament can be assessed and just like in humans, TART changes can be used to find dysfunctions. Additionally, any pain reaction from the horse can be noted, and are represented by the horse throwing his head, pinning his ears back, biting, tail swishing and leg swinging/kicking.



Note: The lamina of the nuchal ligament attaches to the spinous process of the cervical vertebrae (C2-C6) with the nuchal ligament connecting to the lamellar portion. As it runs approaches the thoracic vertebrae, the nuchal ligament eventually becomes the supraspinous ligament.

Treating the Equine Pelvis

Moving 1"-3" laterally, the associated muscles can be palpated and these include the inferior portion of the longissimus dorsi, iliocostalis and psoas muscles. While palpating, just like in individuals, note if the horse shows signs of pain such as tail swishing, pinning the ears, raising the hind legs, rearing, or even moving away from the palpation. In a sacroiliac muscle dysfunction, these muscles can be tight, and tender to the touch which can help confirm diagnoses of a sacroiliac muscle dysfunction. However, since this is a brief project, the muscles associated won't be discussed in this booklet.



Note: The pinned ears, a warning sign of irritation and discomfort. (This is TC, he is my horse, and in this moment I had approached him with a thermometer as a he ran a fever the previous night, equine temperatures are taken rectally. He was NOT happy).



Note: While tail swishes can be due to other stimulants such as flies, when a horse is irritated or in pain, the tail swish will take place at a higher and sharper angle.



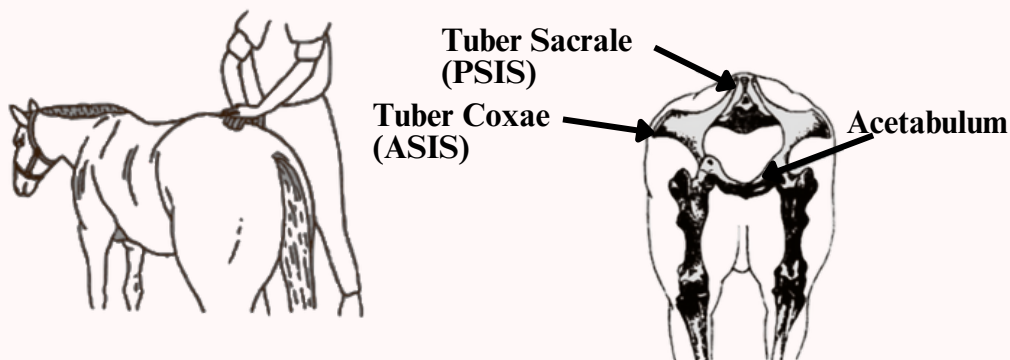
Note: Horses are capable of kicking with either both feet or just one foot.

Treating the Equine Pelvis

Assessing the Sacrum: Sacral Spring Test

After performing a gait test, and palpating the muscles on the equine back, palpation of the sacrum can be performed. This test is very similar to the sacral spring test performed on human patients, however in equines it assess the pelvis for dysfunction. To obtain appropriate results, it must be performed with the physician standing closely above the horse and to the side.

After obtaining a safe and appropriate stance, use the pisiform or the lower palm of the hand to palpate the tuber sacrales and push down to load the pelvis and then release. Repeat this with bilaterally, and note the positive side, which is the side that does not spring back or springs back with limitations. Often, this fixed side is also tender, and will correspond to a hiking of the pelvis when assessing gait at a walk or trot.



Assessing the Sacrum: Determining a high or low Pelvis

Once the side of the dysfunction is determined, another inspection of the pelvis from the posterior side is performed to determine an anterior or posterior pelvis. For example, if the right side has a positive spring test, sore and it looks lower than the left pelvis, it is a right ventral pelvis.

Treating the Equine Pelvis

Providing Treatment: Adjusting the Anterior Pelvis

One of the ways to adjust an anterior pelvis is through high velocity low amplitude (HVLA), especially if this is the horse's first treatment and not trained for muscle energy technique (MET). Additionally, due to their large size and impressive musculature, treatment for equines often calls for a veterinary assistant, with this pelvic HVLA being one of the treatments that needs one.

1. To adjust the low pelvis, stand on the dysfunctional side facing the anterior pelvis, and place the non-dominant hand on the tuber coxae (ASIS) and the dominant hand on top of the contact hand. It is essential that the hands be placed vertically so that the fingers are perpendicular to the tuber coxae, as this is the angle of the thrust.
2. The force of the thrust necessary for treatment is large. Thus, it is recommended for both safety and appropriate treatment to place one leg behind and the other leg in front with the knee bent. This allows for generation of the force necessary to thrust and treat the pelvis.
3. At this point, the veterinary assistant will stand on the non-dysfunctional side, however closer to the cranial side of the pelvis. The assistant will also apply a counter pressure on the non-dysfunctional side with hand placement similar to that of step 1.
4. On the dysfunctional side, apply pressure with an increasing force until a hard stop is felt and maintain this pressure. Ensure that the assistant is applying firm counter pressure simultaneously, and then apply a fast thrust.
5. Treatment has been adequately performed when a ripple effect is seen at the top of the pelvis, as this confirms the pelvis has been placed in motion with the thrust.

Treating the Equine Pelvis



Sacral Spring Test of the Left Sacrum



Sacral Spring Test of the Right Sacrum



My contact hand is on the tuber coxae (ASIS) and I am in the process of placing my left hand on my contact hand.



My 'assistant' placing a counter pressure.

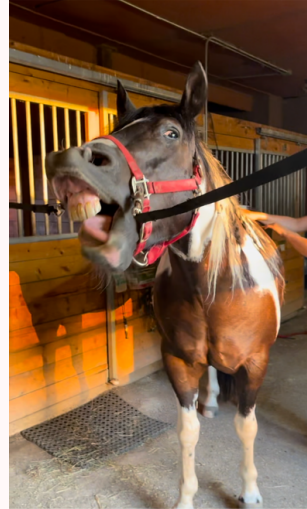


At this point I pushed to the barrier before providing a thrust.

Treating the Equine Pelvis

Providing Treatment: Reassessment

To confirm that treatment was positive and beneficial reassessment can be performed through repeated palpation and noting signs of pain and distress, and through a repeat gait test. Additionally, equines express relief post treatment through a variety of ways, some of which are noted in the images below:



Lick and Chew: This is a sign of relief from pain or discomfort that a horse performs and consists of repeated licking and chewing even though there is no treat or food present.

Soft Eyes: This is another sign that the horse is experiencing relief. Horses are prey animals and are usually always alert, therefore soft eyes are an indication of comfort and trust.

Yawning: Since horses are prey animals, they only sleep for 2 hours and spend the rest of the time guarding their herd. Thus, for a horse to yawn, he must be extremely relaxed and feeling relief.

Treating the Equine Pelvis



Rolling: This is where the horse drops to his knees and lays on his side so that he can roll his body. It is parallel to stretching after treatment and is also a sign of relief, in fact, horses with a limited range of motion aren't able to perform this maneuver.



This maneuver also allows the horse to stretch the spine and even realign it (which is much easier to do after treatment). This is especially important as due to their anatomy, it's difficult for physicians to attempt to achieve this.

It is also a great way to scratch those hard to reach places!

TC rolling after treatment

Closing Thoughts

Just like the human body, the equine body can have many different types of dysfunctions and treatment can depend on the dysfunction.

This booklet was truly a fun project that was meant to explore one form of dysfunction and one form of treatment. Thank you to those who supported me in finishing and submitting this project, and I sincerely hope that you enjoyed going through it, learning about equines, and, at the very least, enjoyed the pictures.



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