

International Diploma of Animal Osteopathy

Equine and Canine stream

Osteopathic considerations and the effects of osteopathic treatment in gaited horses

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Date of submission:

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Introduction

The purpose of this paper is to investigate how gaited horses can benefit from osteopathic manual therapy and what considerations the osteopath needs to have when assessing and treating a gaited horse.

This paper will bring together the foundation of osteopathy with knowledge of gait and the body of a gaited horse. It will be investigated how osteopathic techniques can impact the musculoskeletal system to improve function and health to gaited horses.

Osteopathic foundations

Osteopathy was founded by Dr. Andrew Still. After losing 3 of his children, he wanted to better understand disease and how to cure diseases. He developed manual techniques and the osteopathic way of thinking (Gewitz 2014).

There are four principles that osteopathic treatment is built on (Chila 2011).

1. The principle of body unit

All body parts are related in order to function. If there is a change in one part of the body, this will change the body's function as a whole.

2. Inter-relationship between structure and function.

The structure of a body part will also determine its functions and the loss of function will result in change of structure.

3. Self-regulatory and self-healing systems

The body has the capacity to self-regulate and self-heal to stay healthy or to return to a healthy state after disease. The body becomes dysfunctional when one part compensates due to disease in another part of the body.

4. The rule of artery is supreme

Proper blood flow is vital for healthy tissue as it delivers nutrition and removes waste products.

This paper will focus on the biomechanical model, which is one out of five body function models, that an osteopath can use when approaching a patient. These five models are body functions that keep the body healthy and help recover from diseases and the functions of the five models are interrelated with one another.

- Biomechanical model
- Respiratory/circulatory model
- Metabolic/energy model
- Neurological model
- Behavioral model

The biomechanical model consists of the musculoskeletal system and is associated with the horse's posture and motion. The osteopath uses the musculoskeletal system as a window into the health of the whole body, as dysfunction in one of the models will have an impact on the musculoskeletal system.

Changes in the horse's body is defined as somatic dysfunctions. A somatic dysfunction is an area of the body where tissue has changed, with potentially effect on other sites of the body. To diagnose a somatic dysfunction the osteopath will feel for tissue texture changes, tenderness and restricted motion and the osteopath will also look for

asymmetries. The osteopath will then try to restore the function and structure of the dysfunction and the surrounding tissues using manual techniques on the musculoskeletal system. The osteopath will focus on the cause of dysfunction or pain and not only concentrate on the symptoms.

Osteopathic techniques

The osteopath can use different kinds of techniques on the horse depending on the individual horse and the needs.

The different techniques could be soft tissue techniques (muscle and myofascia), joint mobilisations techniques, such as osteopathic articular balancing (OAB) or high-velocity, low-amplitude (HVLA) or cranio sacral techniques.

Soft tissue techniques aim to reduce tension in muscles and fascia, increase blood flow and reduce pain. The techniques may stimulate changes in the neurological signal related to motor control and pain (Haussler 2018) The joint mobilisation technique as OAB uses repetitive joint movement within the passive range of motion. The technique aims to restore normal joint mobility, muscle function and to stretch connective tissue.

The HVLA is a manipulation technique that moves a joint beyond its physical range of motion using a direct impulse or thrust on the joint (Haussler 2009, Study notes LCAO).

Both joint mobilization and manipulation can be effective in helping horses in pain, neuromuscular deficit from injuries, postural control and locomotor issues (Haussler 2018).

The purpose of cranio sacral techniques is to relieve pain and tension in the skull, spine and sacrum by securing or restabilizing the natural flow of cerebrospinal fluid (Study notes LCAO). The overall aim of the techniques mentioned above is to secure proper

function of joints, muscles, fascia and ligaments to facilitate the body's self-healing mechanism.

Gaited horses

Gaited horses are able to perform a two-beat lateral gait, called pace, and/or a four beat gait called tölt/extended walk.



Figure 1

Left: Horse in tölt (https://en.wikipedia.org/wiki/Ambling_gait)

Right: Horse gait - pace (from Meyers Lexikon, 1896)

Various breeds are able to perform other gaits than walk, trot and canter as the icelandic horse, tennessee walking horse, paso fino and some thoroughbreds.

The tölt/extended walk is a four beat gait that is faster than the ordinary walk. Each hoof leaves the ground and sets down independently. The sound (foot fall) should be even between each landing. The horse will nod their heads up and down a bit more, but the back and croup (sacrum) will show less motion (Ziegler 2005). The stride length will be

shorter compared to the trot and the horse will carry the head higher (Waldern et al 2015).

In the two-beat lateral gait (pace) the horse sets down or picks up the hooves on the same side of the horse with a possible suspension phase in between moving left and right side. The horse will have a more swinging motion of the neck, trunk and hind end from side to side (Ziegler 2005).

The osteopathic treatment in relation to the gaited horse

The osteopathic assessment will start by assessing the horse in a standing position and then performing a gait analysis of the horse in walk and trot.

Static observations

When assessing the horses standing symmetry the osteopath must consider the breed and the general conformation. One study showed that gaited horses have different skeletal morphology, compared to non-gaited horses. Data showed that gaited horses have longer forearms, cannon bones and hooves, indication that their proportion and angle could be different. But the study also concluded that conformation between different breeds vary (Staiger et al 2016). General knowledge on breed conformation will be an advantage. But regardless of breed, the osteopath must consider the symmetry of the horse. To the authors opinion, the general characteristic of a balanced horse will be applicable to gaited horses as well.

Dynamic observations

When assessing the movement of the horse in walk and trot, the osteopath looks for movement asymmetries, the quality of movement and to assess any lameness. It can be difficult in some gaited horses, as not all gaited horses trot by hand and their walk can also be impaired by the movement pattern from the pace and tölt. As previously described, the horse shows less movement of the back and pelvis during tölt, which can make it difficult for the osteopath to truly assess the quality of movement, range of motion and potential asymmetries in these areas.

Even in walk and trot the motion of the upper body and the stride length is different when comparing Warmblood horses with Icelandic horses (Rhodin et al 2022).

Asymmetries at the head and withers in walk and trot are indicators of lameness.

A study showed that the range of movement at the head, withers and pelvis in walk and trot did change due to lameness in gaited horses, but the changes was not that clear when the horse was tölting (Smit et al 2024), making it difficult to identify lameness for the osteopath if the horse primarily shows tölt.

Palpation

After the dynamic observations the osteopath will start palpating the horse's body, feeling for any tissue tension, swellings, irregularities and asymmetries. Palpating the entire body of the horse is of great value for the osteopath, as it gives a picture of the body's function. As mentioned in Osteopathic foundations the structure of a body will determine its functions and the loss of function will result in change of structure.

Muscular tension can also come from acute stress (Rankins et al) and the osteopath needs to pay attention to the expression and behaviour of the horse to make the right assessment.

Treatment of the spinal column

The spinal column of the horse consist of 7 cervical vertebrae, 18 thoracic vertebrae, 6 lumbar vertebrae, 5 fused vertebrae in the sacrum and a varying number (15-21) coccygeal vertebrae. Besides the bony structure of the spine it also consists of muscles, ligaments, tendons and fascia with supports and moves the structures.

Gaited horses have the same anatomical structure as non-gaited horses, but they use it to some extent differently in the additional gaits as tölt and pace, which potentially can affect the body over time.

The cervical spine

During tölt the head and neck position of the horse differs from the more free position, as it is held in a more raised shape (Waldern et al 2015)(see figure 1).

When the head is up in a fairly high position the neck will go into extension and lock for lateral movement of the atlanto-occipital joint (Higgins 2009). High head and neck position can lead to tension at the poll, tension in the brachiocephalic muscles (Higgins 2009) and stiffness in the neck. The brachiocephalic muscles insert into the humerus and thereby have an effect on the forelimb movements. This corresponds very well to

the principle of body unit and inter-relationship between structure and function as described in osteopathic foundations.

The brachiocephalic muscles and other muscles in the neck are part of the thoracic sling, which will be described in the section 'osteopathic treatment of the limbs'.

Pain in the brachiocephalicus is common and is associated with pain or stiffness in the lower cervical spine. Muscle atrophy due to cervical dysfunction can be seen within the lower cervical part affecting the splenius muscle and the semispinalis muscles. Pain and stiffness will have an effect on cervical mobility and horses may refuse to bend laterally or rotate their heads when trying (Story et al 2021).

Reduced range of motion in joints can lead to muscle spasm, nerve dysfunction and pain. The horse may also show compensatory changes in their body, leading to dysfunction in other parts of the body and thereby increasing the risk of injuries (Story et al 2021).

In order to have a proper function of the cervical spine the osteopath can use different kinds of techniques mentioned in osteopathic treatment. The technique OAB can be used to assess the mobility of each joint in the cervical spine and can also be used as treatment. This is performed by examining each joint in sidebending from both sides of the horse, thereby finding any potential restrictions. The method HVLA can also be used on the cervical joints and the soft tissue techniques will help reduce the tension in muscles and fascia of the cervical spine. It is possible to use mobilization exercises to mobilise the joint but also to activate and strengthen the whole body (Story et al 2021). In humans, osteopathic manual therapy and exercises have shown to reduce pain and

improve function (Groisman et al 2019) and in horses osteopathic manual therapy have shown positive effect in caudal cervical dysfunction (Ramon et al 2025).

The thoracic and lumbar spine

A study have shown that elevated head and neck positions in the unriden horse have an influence on the back as it induces extension of the back in the thoracic region and flexion in the lumbar region, which reduces range of motion (Gòmez Àlvarez et al 2006).

A study also found extension of the back during tölt in Icelandic horses, but not to the same degree as in other breeds, possible due to short backs and higher muscle density (Waldern et al 2015). The pace has also been described as being hard on the horse's back as during pace the back will be more concave (Vincelette 2023).

Extension of the horse's back could over time increase the risk of injuries and pain and lead to the dorsal spinal processes coming closer together or even touch one another, leading to bony pathologies such as kissing spine.

Problems in the horse's back could be expressed as muscle tension, reduced range of motion, reluctance to do specific movement and pain. Back problems can be related to dysfunctions in the muscles and joints with secondary dysfunction of the soft tissue. The horse can develop new movement patterns in order to avoid pain and discomfort, leading to a risk of dysfunctions in other parts of the body (Haussler 2009).

The osteopath may, as with the cervical spine, assess the mobility of the spine, finding potential restrictions. The osteopath will then assess which treatment method will be most suitable for the horse, as all of the osteopathic methods mentioned in the section of 'Osteopathic treatment' could be beneficial for spinal restrictions.

There are few studies examining the effects of manual therapy on horses, but those available indicate that joint mobilization and manipulation can reduce pain, stiffness and muscle hypertonicity and the studies show effect after a single treatment. Spinal flexibility was improved after spinal mobilization and manipulation with an immediate effect for manipulation and a delayed effect for the spinal mobilization (Haussler et al 2021). Treatment of the back with cranial sacral therapy has shown positive effect on the pain threshold limits and can also be used as a treatment method for back dysfunctions (Voretyté-Vileniske et al 2022). Massage therapy has also shown to be effective for reducing pain in the thoracolumbar spine (Haussler 2009).

In order to have a successful outcome in the long run, the primary problem must be addressed. The primary problem can be a somatic dysfunction in the cervical spine or the back after a traumatic event, but it can also be the tack, poor riding skills or other pathologies in the horse that must be addressed. For example if the horse presents with an overdevelopment of the ventral cervical muscles, this could be an indication of incorrect training (Higgins 2009).

Treatment of the limbs

A study of the gait mechanics of tölt in Icelandic horses showed that there was increased weight on the forelimbs during tölt and that the forelimb has a higher flight arc compared to trot (Waldern et al 2015). This is also a highly valuable trait of the Icelandic horse in competitions and breeding. The increased weight and movement on the forelimb could over time increase the risk of injury and overuse of certain muscles.

The muscles responsible for protraction, such as the supraspinatus, biceps brachii, trapezius and brachialis muscles, could be overused and become hypertoned and inflexible. The high movement of the forelimb is only possible if the opposite (antagonistic) muscles to the protraction muscles relaxes and stretches. For the movement to be smooth and well coordinated, there needs to be balance and well function between the muscles that contacts for movements and the muscles that stretches.

Furthermore the function of the thoracic sling will have an impact on muscle use and development. The high head position during tölt and pace, can weaken the thoracic sling musculature, which is important for proper function and stability of the limb (<https://www.animalosteopathycollege.com/blog/understanding-and-strengthening-the-thoracic-sling>).

During tölt the horse steps farther towards the center of their body with the hind limbs (Waldern et al 2015). To do this, especially at high speed the hind limb joints and soft tissue must be mobile and flexible. For the horse to be able to step farther with the hindlimbs, the gluteal muscles, the hamstrings (biceps femoris, semitendinosus and semimembranosus muscles) needs to be soft and able to stretch. As with the forelimb there needs to be balance and well function between the muscles that contacts for movements and the muscles that stretches.

In Icelandic horses, joint changes as bone spavin can be a pathological cause of reduced range of motion, altered movement pattern and lameness. Bone spavin is osteoarthritis in the tarsal joint. Bone spavin was found in approximately 30% of the

Icelandic horses used for riding. There can be palpatory abnormalities of the medial aspect of the distal tarsal joint, due to soft tissue proliferation (Björnsdóttir 2002).

The large movement pattern in both the forelimb and hindlimb will require flexible soft tissue, correct muscle tone and mobile joints. Restriction in one of these areas will have an effect on the range of movement. The large movement also requires proper muscle development to secure the stability of the joints and surrounding tissue.

The osteopath will evaluate the muscles through palpation and the quality of the movement of the joints in the forelimb and hindlimb using ex. OAB. The osteopathic techniques used for assessment and treatment will mechanically stimulate the skin, fascia, muscles, tendons, ligaments and joint capsules. This stimulation will help to restore structural and functional properties of the tissue (Haussler 2009). The mechanical stimulation activates the proprioceptors, nociceptors and the muscles spindles, that will send an afferent stimuli to the peripheral nervous system and the central nervous system and thereby it will have an effect on the muscle tone and the movement pattern (Haussler 2018).

Conclusion

The aim of this paper was to investigate if gaited horses could benefit from osteopathic manual therapy. The gaited horses have the ability to perform a two beat gait called pace and/or a four beat gait called tölt/extended walk besides the regular gaits (walk, trot and canter). These gaits have some other biomechanical characteristics, such as high head position in tölt and large forelimb movement. That can potentially put the

horse at risk for dysfunction in the body, as it affects the mobility at the poll and the cervical spine and it will have an effect on the spinal position. The large forelimb movement demands a balance between the muscles that contract and the muscles that stretches, in order for the movement to be smooth and coordinated. Osteopathic treatment can help to restore structure and function of the joints and tissue, by several techniques that mechanically stimulate and activate the proprioceptor and muscles spindles, that by the central nervous system and peripheral nervous system will control and have an effect on the muscle tone and movement pattern. Osteopathic treatment could be a useful tool for helping and restore proper biomechanical function and to help alleviate dysfunction in gaited horses.

Besides assessing and treating the musculoskeletal system of the horse, the osteopath must consider other issues that could be causing the dysfunction, such as riding skill, tack and potentially pathologies. These must also be addressed in order to have a successful outcome.

Litterature

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