

OSTEOPATHY AND THE ARTHRITIC EQUINE

Charlotte Sweeney



London College of
Animal Osteopathy

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The Application of Equine Osteopathy in the Arthritic & Joint Compromised Equine Athlete



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1. Equine Osteopathy – An Introduction

To understand the benefits that Osteopathy can offer as a modality, one must first understand the modality itself, what it aims to do, and how it achieves this. Furthermore, this paper will discuss the key highlighted benefits that Osteopathy can provide to equine athletes who are primarily affected by arthritic change or generalised joint change, and how Osteopathy can secondarily offer support to relieve these athletes not only symptomatically, but mentally.

Osteopathy, specifically Equine Osteopathy, is a form of manual therapy. It involves the application of multiple specialised and specific articular balancing techniques, to assist the body's joints to reach their full range of motion, and the soft tissues to become supple and elastic. It focuses primarily on the principle that in addressing somatic dysfunction or pathophysiology (Taylor Still, 1902) Osteopathy, if applied correctly, can be instrumental in benefiting the joints, muscles, tendons, ligaments, and fascia. One of the primary focuses of Osteopathy techniques is stretching and articulating the body, therefore, it offers a great deal of benefit to not only soft tissue structures but also the joints of the horse. (Anthony Pusey)

2. Osteopathic Articular Balancing – Introduction to techniques and benefits in Equine Practice.

Osteopathic Articular Balancing can apply direct pressure via its specific techniques to not only the direct and superficial soft tissue structures, but also via blood vessels, cartilage, and the synovial membrane. Its broad reach is effective in providing relief and alleviating pain throughout the body.

Not only are manual therapies such as Osteopathy effective in combating a range of muscular-skeletal restrictions, but they are also highly valuable in supporting the body's nervous system. (LCAO, 2021) As the therapy is applied, we notice several direct physical changes such as a reduction in heart rate, stress levels and overall mental tension, all directly stimulating the parasympathetic nervous system. (Korr, 1975) When observing the central nervous system's ability to detect peripheral pain signals, the relaxation, and release of pain throughout the body can be observed during and after an osteopathic treatment and is key in supporting many different ailments within the horse's body, including arthritis. Specifically, Osteopathic Articular Balancing uses a range of mobilisation techniques, including the manual application of side bending – rotation – circumduction – translation – and articulation to engage the joints and surrounding soft tissue structures in increasing elasticity and range of motion. (LCAO, 2021)

Osteopathy can help horses in many different and diverse ways, and the benefits are far from exclusive to horses with arthritic change. These benefits include but are not limited to, relieving pain, whether that be chronic or acute, relieving compensatory pain, relieving tension throughout the whole body, improving the elasticity and flexibility of tissue, primarily around joints, increasing circulation and blood response to tissues, stretching fascia, reducing scar tissue, improve joint flexibility, also aiding in primary freedom of nerve function, and addressing patterns of somatic dysfunction. Thus, aiding to potentially reduce inflammation and discomfort. It's also highly beneficial for injuries relevant to muscle strains, ligament, and tendon strains, and finally, even arthritic change. (Anthony Pusey, 2008)

3. Understanding the basis of Osteoarthritis and Degenerative joint Pathologies

To understand how Osteopathy can benefit arthritis, is it important to understand what Arthritis is and how it can affect the body. Arthritis refers broadly to a group of degenerative joint diseases, however, for this research assignment, we will focus on the kind most commonly found in competition and performance horses, osteoarthritis.

Osteo Arthritis is most commonly known as the deterioration of a joint's internal tissues and cartilage, which can commonly be accompanied by inflammation. The joint surfaces can also experience an inflammatory reaction creating bony change or ossification in response to this inflammation. (Al, 2009) Most commonly this occurs within synovial joints, where the articular cartilage gradually deteriorates over time from factors such as stress, age, injury, and pressure from high degrees of intensive exercise. Most commonly, arthritic change can be observed within but is not limited to, hinge joints, ball and socket joints and facet joints. Poor conformation can also be a key factor in horses being pre-disposed to arthritic change, due to poor conformation angles causing an increase in mechanical forces, weight-bearing or repetitive strain to the horses' joint structures. (Frisbie, 2016)

The purpose of cartilage within a joint is primarily to protect the bony surfaces, in simple terms, a cushioning, lubricating and shock-absorbing layer between two bones.

There are many triggers and pathologies that can cause change within a joint's surface, commonly a trauma, repetitive strain, or occasionally an inflammatory response at a cellular level, cartilage can deteriorate. The Joint's cartilage will then begin to break down, and the once smooth texture, designed to enable a sufficient gliding surface, can become rough and abrasive. In highly advanced Arthritis, cartilage can become almost non-existent, creating the joint's bony surfaces to communicate directly, creating lesions within the joint capsule, and in very advanced pathologies, creating a shearing motion bone on bone.

As a result of the ongoing deterioration of cartilage within the joint, the horse can experience, direct joint pain, decreased mobility, gait unevenness, lameness, and discomfort. As such, in many cases, a secondary, compensatory, and mechanical dysfunction will begin to occur within the horses' posture and gait. (Frisbie, 2016)

4. The Performance Equine and the consequence of osteoarthritic change

The equine body is highly efficient at providing protective and defensive strategies to help compensate for pain and weaknesses within joints. This occurs when the joint's surrounding soft tissue structures, such as tendons, ligaments, and muscles begin to exert more pressure and workload. The soft tissue can become tighter, and in turn, shorter, more restricted and under high levels of tension. Long term, this can include a decrease in circulation, weakness, and atrophy. This will commonly present clinically as somatic dysfunction within musculoskeletal compensatory pain patterns. These patterns can also be referred to as osteopathic lesion patterns, and pathophysiological dysfunctions. (LCAO, 2021)

Within the Osteopathic theory taught by Prof. Stuart McGregor (London College of Animal Osteopathy), there are two primary and common lesion patterns presented. One case study example presented later in this paper will highlight an example of this in relation to Tarsal Arthritic change within a Thoroughbred performance horse.

Whilst the bodies' employment of these patterns can temporarily aid in compensation for a weaker joint, long-term compensation within the body can lead to an overall mechanical dysfunction, dysregulation of gait and weakness in posture. This commonly shows up within symptoms such as muscular soreness, sensitivity, atrophy, hypertrophy of muscle groups, and a reduction in circulation and elasticity. (Higgins, 2012)

Commonly, it can be noted that the horse will become weaker in posture, experience a loss of topline muscle, and can even lead to behavioural changes as a result of chronic pain.

Dynamic and biomechanical changes are likely to also be noted as a result.

Compensatory changes (non-specific to osteopathic lesion patterns) happen over time and can somewhat be described as a domino effect. Say, for example, a horse becomes stiff within a hock due to joint change, they may start to tighten within the immediate surrounding soft tissue structures of that joint. For example, the deep digital flexor muscle, lateral digital extensor, and long digital extensor. Over time this can become referred to and include other muscles such as gastrocnemius and biceps femoris. Specifically, these muscles can become tight, restricted, and tender, and include painful signs such as spasms when palpated, due to their prolonged and increased workload. It would be reasonable to observe a reduction in the hock's range of motion when conducting articulation of the joint, and also within the stifle and coxae-femoral (hip) joint. The reason these specific muscles and structures are highlighted in relation to the hock is due to that they all have a direct mechanical influence on its movement. This is just one very localised example of how a hock joint may cause muscular change within the immediate soft tissue structures and will be drawn on later in this paper in relation to a field case study. Of course, it is important to highlight that these are not the only muscles that could be affected.

Should the arthritic change be advanced enough, long-term compensation can make lameness diagnostics more complex. This occurs as the entire body changes to adapt to its weaker joint or multiple joints. This is when lesion patterns are most likely to be observed. For example, at the trot, horses work within diagonal pairs, if we are using a hindlimb as our primary source of pain, it is possible that they can appear uneven on the contra-lateral foreleg also. (Al, 2009)

Commonly, signs of advanced arthritic change can be visible to the eye. Whether this occurs as a joint beginning to accumulate fluid, (effusion), a change in the bone's externally palpable surface, a change in gait, whether immediate or gradual, overall stiffness, an acute change in behaviour, obvious physical impairment, or lameness. Secondly, physical changes are likely to become apparent and obvious when palpating the key soft tissue areas of the body. (Frisbie, 2016)

5. The Application of Osteopathic Articular Balancing in the Joint Compromised Equine – Symptomatic Relief, Prevention and Intervention.

So, how does Osteopathy directly benefit arthritis? In the above introduction, a broad range of benefits were discussed as to how Osteopathy can benefit the Equine Athlete. One of the key differences between other modalities, and Osteopathy, is its holistic focus not only on the joints themselves, but also on the soft tissue structures surrounding the joints, and how to best release them.

Primarily, Osteopathy can help to ease arthritic pain by relieving referred muscle and joint stiffness, pain, and inflammation in the tissues surrounding and supporting the affected joint.

Through stretching, working, and releasing the restricted soft tissue fibres close to the joint, it enables and enhances circulation and blood flow. The elasticating effect on the muscular structures via Osteopathic Articular Balancing techniques can help to reduce the compression of blood and lymph channels. This can aid in reducing inflammation, and subsequently pain. (Anthony Pusey, 2008)

Osteopathy can aid in decreasing overall bodily soreness, restriction, and stiffness. As discussed in the prior paragraph on compensatory pain, the body's own defensive mechanisms will cause significant distress to referred muscle groups and joint function. The release, elongation, and increased elasticity of these areas will aid in an overall improvement in flexibility and enable the body to balance its natural and base mechanical distribution of pressure as evenly as possible. This positive increase in mobility will help to stop the domino effect arthritis can have. (Taylor Still, 1902)

To preface the below example, as one joint becomes restricted, the directly related soft tissue will begin to work harder and exert more pressure. This is not exclusive to surrounding tissues, and the loading of other joints can also have a negative impact on mechanical elasticity and range of motion. Following from this, further along, the body, structures that were originally functioning at full capacity will start to compensate for the initial soft tissue and joint structures that have undertaken more pressure. If as therapists, we can help to alleviate this trail of defensive restriction, we can aid the body's ability to stay strong, straight, supple, and even, have a greater mechanical range and stay stronger, thus helping to relieve pain. (Anthony Pusey, 2008)

Not only can Osteopathic techniques help to treat arthritic horses, but they can also help to prevent early injury onset or excessive strain to joints caused by generalised soft tissue and joint restriction.

One of the challenges of treating arthritis within a horse is the increased risk the horse has of developing other injuries as a result of a compensatory gait change or abnormality.

When the body has loaded pressure on concentrated areas, the risk of injury to these areas becomes increased. For example, if we imagine a horse on course jumping, a limb taking a higher percentage of body weight will be far more predisposed to a distal or lower limb joint strain or soft tissue injury, due to this increased pressure, comparatively to a horse who has an even bodyweight percentage on both limbs. (Al, 2009) To continue this example, a horse with arthritic joint change in the left hock joint, for this discussion let's use the proximal intertarsal, could be predisposed to a higher level of force through the contralateral distal limb soft tissue structures. The most likely to be affected is the Suspensory ligament, SDFT or DDFT. (superficial and Deep Digital Tendons), as well as the contra-lateral joints of the forelimb.

If an Osteopath can address musculoskeletal compensatory changes using Osteopathic balancing, manipulation, and release early after an arthritic change has begun, it can help to correct asymmetry within the musculature. By being effective in correcting asymmetry, we can effectively minimise a horse's imbalance, both statically and dynamically, thus aiding to prevent further injury as a result of an impacted gait mechanics or imbalance.

Likewise, a horse who is suffering from pain via another external factor, for example being worked incorrectly or who has a bad saddle fit, can be more predisposed to arthritic change by compensating for the way he moves and loading his joints with unnecessary pressure due to the avoidance of engaging correct muscle groups. Osteopathy can greatly help to combat this as regular assessment and treatment can help to pick up on these imbalances early before they begin to have long-term adverse effects on the joints.

6. A Field Case Study – 14yo Thoroughbred Eventing Horse

The below case study was conducted by C Sweeney, a Student of LCAO Diploma in Equine Osteopathy. A Presenting case study where the benefits of Osteopathy were presented clearly and were greatly apparent, was a 14yo eventer with arthritic hock changes, specifically within the tarsocrural joint. This was diagnosed by a veterinarian after the horse showed a chronic pain pattern and was referred for a lameness workup and diagnostics. It's important to note that this horse was not showing acute or even subtle lameness during dynamic osteopathic assessments as this early stage. The arthritic change was present bilaterally, however the offside was more significantly affected.

He showed soreness and tension, as well as deep spasms and soft tissue pain/reaction to palpation throughout most of his body. Key areas that showed hypertrophy were the lateral, deep, and long extensor muscles, biceps femoris, gastrocnemius and semimembranosus/tendinosis. The restriction of these muscles caused a noticeable shortness of stride within both hind limbs. In one example the primary function of the gastrocnemius muscle was to extend the hock, and flex the stifle, it became apparent that this horse was having difficulty utilising the hindlimb stay apparatus. It's important to note that highlighting one muscle out of an entire group is an over-oversimplification, however, this is just one example of a directly referred mechanical imbalance. Secondly, if we take the biceps femoris, noting that its caudal division is responsible for flexing the stifle, abducting the hindlimb and extending the hock joint, we can understand that a hock joint containing restriction will cause resistance, and thus increase the workload of this muscle.

When palpating this horse utilising the techniques within Osteopathic Articular Balancing, it was notable that there was a reduction in movement throughout side bending and rotation of the pastern, flexion, and extension of P1-2 (Phalanx 1 and 2) and a reduction in translation of the metacarpophalangeal joint on the right hind limb. This could be a direct result of a lack of flexion through the hock – specifically the Tarsocrural joint, therefore the entire distal hindlimb joints have not been extending or flexing to their true range of motion.

Commonly, this gelding would have significant lower lumbar and gluteal pain and spasm, as well as unilateral brachiocephalicus and thoracic trapezius pain, this is discussed in more depth below. If we again use the biceps femoris as an example, we can see that due to the complex origin and insertion points of the biceps femoris (at the spinous and transverse processes of the last three sacral vertebrae,) excess strain on this muscle could begin to cause pain within the sacroiliac region. Similarly with the medial gluteal and superficial gluteal.

This horse also had notably high and increased stifle pain, which being the reciprocal apparatus for the hock is going to be directly impacted by its impairment and put under significant strain.

If we now take a deeper look at the lesion patterns and compensatory pain presented by this horse, we can observe that he presented on numerous occasions with a type two lesion pattern and somatic dysfunction. It was noted that the offside pelvis appeared to be hiking when observing dynamically at the walk and trot in a straight line. With unilateral thoracic trapezius pain, and contralateral TMJ pain with reduced unilateral C1 rotation.

The direct Osteopathic techniques that benefitted this horse most clearly were the hip, stifle, and hock techniques OAB. He had a low tolerance for work in these areas, so gentle and slow stretching, building over time proved to be the most effective way of combating his pain and restriction. Initially starting with slow and gentle OAB techniques, and eventually a

conservative HVLA adjustment C0-1 and the coxae-femoral joint. Specifically, he was most receptive to protraction stretching through the hamstrings, stifle circumduction and hip mobilisation circumduction. These techniques combined did aid in showing an increase in stride length when applied regularly and with the application depth built up gradually, over 4 treatment sessions. He also showed a far greater comfort level and ability to show a systematic release when these techniques were applied. It is reasonable to conclude that this increase in comfort levels, reduction of compensatory somatic dysfunction and increase in joint elasticity is likely to reduce further arthritic change to unnecessary loading of compensatory joints.

Although Osteo-Arthritic change occurs at a cellular and occasionally systematic inflammatory level, and cannot be reversed with manual therapy, the benefits of osteopathic balancing in application to a patient are clear to aid in relieving compensatory somatic dysfunction and muscular pain patterns. Note: these are not the only muscles to be affected by an arthritic hock joint, just those directly relevant to one particular case study that was undertaken for this paper.

7. *Veterinary Referral, & Potential Contraindications of OAB and HVLA Application in Equine Osteopathic Practice*

The above horse is one example of how Osteopathic and Osteo-Therapeutic techniques have greatly increased a patient's comfort levels via the application of treatment, however, it is important to understand when osteopathic techniques may be contraindicated in the direct application to compromised joints and structures.

Foremost, understanding and assessing an equine over multiple treatments is key in aiding in managing a horse suffering from arthritic change. Generally, there are two ways in which a patient will present for treatment, without a prior diagnosis from a veterinarian, or with. The latter often being more straightforward in complex cases as it eliminates the osteopath's need to ascertain whether referral for further workup and diagnostics is appropriate.

For example, A patient presenting for treatment with chronic or repetitive somatic dysfunction over several treatments, despite showing good release on the day of treatment and immediately after, but reverting to this pattern quickly, may raise a red flag. Being that perhaps the horses' somatic dysfunction is a case of referred and compensatory mechanical adjustment, a veterinary diagnostic workup could be beneficial to ascertain whether a primary source (such as osteoarthritis) is the driving factor behind this pattern.

There are of course, always examples that a patient's dysfunction that is primary and unrelated to a pre-existing pathology, but for the purpose of this paper in relation to OA change, we are focusing on the prior example.

It is important to note that Equine and Animal Osteopaths cannot provide a diagnosis of any joint pathology outside of an osteopathic diagnosis for somatic dysfunction or muscular pain. It is the osteopath's job to show due diligence in being able to assess for highlighted areas of discomfort over multiple treatments and refer when necessary. (Anthony Pusey, 2008)

When a patient has a prior diagnosis, this can be helpful for the osteopath to know that any unstable or compromised joint pathology is already addressed and allows for communication with the treating veterinarian about an appropriate way to proceed.

It is also important to discuss potential contraindications, or circumstances when applying OAB or HVLA (high-velocity low amplitude) techniques that could be at risk of exacerbating

a patient's symptoms or causing potential further damage to a joint capsule. General Contraindications of Osteopathic Manual Therapy include acute inflammation, infection, areas exposed to surgical incision, or acute ataxia.

One example of a more specific contraindication would be a horse with advanced osteoarthritis, an unstable fracture, or ECVM (Equine Complex Vertebral Malformation) in the cervical vertebral facet joint space.

Applying an HVLA technique to this region, if an unstable pathology is present, could pose a risk to the patient for acute pain or complications, such as a calcificationⁱ or ossificationⁱⁱ becoming unstable leading to serious implications for the patients' health. It is within the practitioner's best interest in safe practice to avoid these situations by taking a full patient history, communicating with owners, and ensuring they're confident in their palpatory and assessment skills before applying these techniques to patients.

Osteopathic Articular Balancing as a technique involves a lower risk for practitioner error in technique application, as opposed to long lever HVLA adjustments, and as such is an excellent technique in treating horses with arthritic change or compromised joints. Due to the nature of OAB not containing high velocity movements, its thorough approach to positive release of restriction, and effective nature in increasing range of motion, makes it an excellent therapeutic technique for patients.

8. Equine Osteopathic Application – In Summary

Not only are manual therapies such as Osteopathy effective in combating a range of direct restrictions, but they are also highly valuable in supporting the body's nervous system. As the therapy is applied, we notice several direct physical changes such as a reduction in heart rate, stress levels and overall mental tension as the parasympathetic nervous system is stimulated. As the nervous system is directly responsible for picking up on peripheral pain signals, the relaxation, and release of pain throughout the body can support many different ailments, arthritis included. (Taylor Still, 1902) (Anthony Pusey, 2008)

In summary, the modality of Osteopathy, and application of Osteopathic Articular Balancing, including selective HVLA adjustment techniques, is effective in aiding and treating many different ailments within the horse's body. Primarily, its benefits in aiding horses with Arthritis were included but were not limited to, relieving pain, enhancing circulation, increasing elasticity and suppleness, supporting the nervous system, relieving, or eliminating compensatory and referred pain, relieving, or eliminating biomechanical compensatory gait patterns, and aiding in the reduction of further injury due to compensatory changes.

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ⁱ Calcification – accumulation of calcium salts within an area of body tissue, generally within and around the formation of bone.

ⁱⁱ Ossification – process of bony remodelling or laying down new bony material. Cells responsible are osteoblasts.