

Impact of Osteopathy on the Quality of Sport Horse Performance

Introduction

Since I was a child, I have been fortunate to be part of the equestrian world, which has given me the opportunity not only to build very special relationships with horses but also to learn about their habits, their way of communicating, and their management. Over time, I began to feel the need for horses to be not merely competition partners or athletes to be trained, but true life companions, with whom to share growth, reflection, and study.

This awareness pushed me to study more deeply their behavior, movement, and posture in relation to different biomechanical and psychological situations. I began to question the real functioning of their anatomy and mechanics, the dynamics of every stride, every jump, and every change of direction.

The encounter with osteopathy represented a true revelation for me. This discipline and its holistic way of perceiving the animal — from its physical structure to its mental and neurological components — allowed me to study and understand how to optimize performance and the well-being of the horse by respecting or restoring its balance.

I was able to observe personally how osteopathic care can influence mobility, flexibility, coordination, and even the psychological well-being of animals, proving to be a truly holistic and complementary approach to training and daily management.

For this thesis, I therefore decided to unite my greatest passions: osteopathy — which has now become my profession and which I aim to deepen further — and equestrian competitions, which continue to be a source of motivation and learning. My goal is to explore the relationship between osteopathic interventions and the quality of performance in the equine athlete, analyzing how an osteopathic approach can not only improve sports results but also promote overall well-being and prevent injuries.

Throughout history, the horse has played multiple roles in human life: it has been a companion in everyday life, a helper in hard labor, and a comrade in war. From chariot races in ancient Greece to the warhorses of medieval Europe, horses have always been symbols of beauty, majesty, and strength.

Since the modern era, the sport horse has taken on a leading role in various equestrian disciplines: Olympic show jumping, the refined exercises of dressage, the endurance challenges of long-distance racing, the high-speed agility of polo, and the precise spins and stops of western reining and cutting.

During these years, the equestrian industry experienced its greatest expansion, becoming not only a cultural tradition but a true global economy. In Europe alone, the sector generated several billion euros annually, with over seven million registered sport horses. International competitions, specialized breeding programs, and advanced training centers created a

dynamic environment in which the horse's health and optimal performance became central concerns.

In the last decade, the welfare of these equine athletes has received increasing attention from professionals involved in their care and training. Trainers and owners now recognize that high-level performance cannot rely solely on genetics or rigorous training. Other crucial elements include balanced nutrition, attention to the horse's psychological well-being, the work of a skilled farrier to maintain hoof health, and prevention of musculoskeletal injuries.

Another rapidly growing aspect has been osteopathy — a discipline that views the body as a functional unit and aims to restore structural and physiological harmony. The osteopath works through non-invasive and gentle manual techniques, identifying, correcting, and balancing mechanical dysfunctions which, depending on their nature, may cause problems in movement fluidity, coordination, or range of motion, leading to compensatory patterns or even chronic overload injuries.

The objective of this thesis is to conduct an in-depth analysis of how osteopathic treatment influences the quality of performance in the equine athlete, highlighting its potential for injury prevention, movement optimization, and post-competition recovery.

Different Needs for Different Disciplines

Depending on the equestrian discipline, the biomechanics and management requirements of the horse vary considerably.

In western disciplines such as reining, cutting, or performance classes, horses are required to perform rapid spins, sliding stops, sudden changes of direction, and demonstrate excellent coordination. The hocks, phalanges, and shoulders are subjected to high torsional stress, making joint stability a crucial factor.

Polo, on the other hand, combines sprinting and physical contact, stressing the cardiovascular system and requiring exceptional proprioceptive reflexes. Flat racing demands maximum speed and anaerobic endurance; in this context, the back and forelimbs experience significant strain.

Show jumping requires powerful hindquarters and spinal flexibility to lift the entire body over high obstacles. In this discipline, sacroiliac tensions and suspensory ligament injuries are very common. Dressage, on the contrary, demands precision, rhythm, and symmetry of movement. Exercises such as piaffe and passage require stability, discipline, and suppleness of the neck and back.

Endurance racing, which can exceed 160 kilometers, calls for strong cardiovascular endurance and metabolic efficiency. Key factors include proper hydration and resilient joints and tendons.

The Influence of Breed on Biomechanics

Although differences exist based on discipline, breed, or management, all athletic horses share one essential need: the protection of the musculoskeletal system from trauma and overuse.

Another factor influencing performance and movement is the breed itself. Each equine breed possesses morphological and functional characteristics that make it unique, affecting not only its style of movement but also which parts of the body are most prone to stress and injury.

Knowledge of inter-breed differences is crucial for those involved in the care and training of horses, as it allows for better planning of prevention, exercise, and osteopathic treatment programs tailored to specific needs.

A representative example is the Thoroughbred, the quintessential racehorse. Slender, elegant, and long-limbed, this breed has been selectively bred over centuries to maximize speed and respiratory efficiency. Yet, these same traits predispose it to specific problems: tendonitis from high mechanical load, stress microfractures on hard ground, and inflammation of suspensory ligaments or the fetlock area, particularly in horses undergoing intense training or competition schedules.

Managing a Thoroughbred thus requires a delicate balance between workload, training surfaces, balanced nutrition, and regular osteopathic assessments to detect and correct early mobility restrictions.

The Quarter Horse, by contrast, is robust and compact, with strong musculature and a powerful croup. Its conformation is ideal for western disciplines such as reining, barrel racing, and cutting, promoting rapid acceleration and changes of direction — not surprisingly, since it was originally bred as a working horse.

However, the exceptional power developed in the hind limbs concentrates strain on the hocks, suspensory ligaments, and fetlock joints. Over time, without adequate muscular preparation and proper cool-down routines, inflammation, ligament strain, and joint pain may occur. A targeted osteopathic approach, combined with stretching and controlled strengthening exercises, thus becomes essential to maintain elasticity and reduce the risk of chronic injury.

The European Warmblood, a key breed in show jumping and dressage, represents an ideal combination of power and agility. Its long back and well-developed musculature allow excellent collection and propulsion, but they require particular attention to the lumbar and sacroiliac regions, which may stiffen from repetitive training.

Here, osteopathy plays an essential role, improving spinal flexibility and movement symmetry — qualities indispensable for performing complex exercises such as piaffe or passage.

The Arabian horse, used mainly in endurance competitions over long distances, has developed an extraordinary ability to manage heat and conserve energy. However, such

prolonged efforts challenge the flexor tendons and locomotor system, often causing muscular fatigue. A gradual training program, combined with regular osteopathic check-ups to improve circulation and recovery, is therefore crucial to ensure long-term health.

The Friesian, known for its majestic posture and ample stride, is often employed in shows, parades, and high-level dressage. Its heavy bone structure and dense musculature give elegance and strength but can overburden the shoulder and knee joints, causing stiffness and reduced elasticity. Targeted manual therapy and stretching programs are essential to preserve agility and movement quality.

Even ponies require specific consideration. Breeds such as the Shetland and Welsh are widely used in riding schools for children and in hippotherapy programs. Their short and strong backs often lead to the mistaken belief that they are indestructible. In reality, repetitive activities or excessive workloads — such as too many lessons without adequate rest — can cause lumbar pain, joint inflammation, and microtraumas from repeated stress.

These examples demonstrate how breed, morphology, practiced discipline, and training level are interrelated factors that profoundly influence the health and performance of the equine athlete.

For this reason, a personalized osteopathic approach — integrated with attentive management of training, nutrition, and recovery — is a key element in maintaining every horse, from the fastest Thoroughbred to the school pony, in peak condition.

Only through a tailored prevention and treatment plan can the risk of injury be reduced, the athletic career prolonged, and the highest level of well-being ensured for these extraordinary four-legged athletes.

The Concept of Performance

When speaking of performance in the equestrian field, one refers to the horse's ability to execute complex movements with balance, strength, coordination, and mental focus. Performance is therefore not a single parameter, but the outcome of a dynamic interaction between multiple physical and psychological components. Understanding these factors is essential for anyone aiming to keep a horse in optimal condition, whether it be a competition athlete or a recreational partner.

The foundation of every performance lies in genetics and anatomical conformation. The length and angulation of the limbs, back conformation, connective tissue quality, and overall musculoskeletal symmetry determine the animal's starting potential. Horses with a strong skeletal structure, well-aligned joints, and a flexible, stable back tend to be naturally more resistant to strain.

For example, a horse with well-sloped shoulders will have a longer stride and better shock absorption, while a properly shaped pelvis will facilitate effective propulsion during galloping or jumping.

If genetics provide the foundation, training represents the factor that develops and consolidates innate abilities.

Another essential factor is nutrition. Adequate energy intake and proper levels of minerals such as calcium, phosphorus, and magnesium are crucial for joint health, hoof quality, and muscle recovery.

A diet deficient in proteins or vitamins may result in reduced tissue elasticity and prolonged healing times after exercise.

Hydration is equally critical: even mild dehydration can shorten stride length, raise body temperature, and slow post-exercise recovery processes. Especially during periods of intense training or competitions in hot climates, electrolyte supplementation and constant access to fresh water are indispensable strategies.

From a mental perspective, the horse's psychological condition is an often underestimated but equally important element.

Chronic stress can increase cortisol levels (the stress hormone) leading to negative effects on the immune system and muscle balance. Tension, nervousness, and lack of concentration decrease movement quality and raise the risk of injury.

Well-structured routines, regular turnout in the paddock, and a calm environment promote relaxation, learning, and improved performance.

Alongside these fundamental elements, osteopathic care plays a pivotal role in optimizing performance.

Through careful evaluation and targeted manual techniques, the osteopath can identify and correct structural imbalances that neither training nor nutrition alone can resolve.

Joint restrictions, fascial tension, or muscular dysfunctions may compromise movement efficiency and predispose the horse to overuse injuries.

Osteopathic treatment aims to restore mobility and bodily harmony, improving circulation, proprioception, and overall balance.

By integrating manual therapy with training programs, nutrition, and stress management, it becomes possible to ensure the equine athlete's optimal and lasting performance.

The performance of a sport horse is not merely a matter of speed, jump height, or endurance; it is a complex combination of strength, balance, joint flexibility, neuromotor coordination, and mental concentration.

All of this arises from the interplay of numerous biological, environmental, and management factors that determine athletic potential and sporting longevity.

Factors Influencing Performance

The primary foundation is genetics, which defines back conformation, limb angulation, and connective tissue quality.

Horses with robust, well-aligned musculoskeletal structures start with a natural advantage in terms of resilience and movement fluidity.

Andrew Taylor Still, the founder of osteopathy in the late nineteenth century, already asserted that "structure governs function," emphasizing that a well-built body is key to optimal function. This concept remains relevant today: a stable back and a spine free from vertebral restrictions form the foundation for every athletic performance.

If genetics provide the potential, training transforms it into real ability. Progressive, well-planned programs improve cardiovascular efficiency, aerobic capacity, and muscle strength.

Excessive workload or overly rapid progression, on the other hand, may cause microtrauma and joint overload. Balanced training — alternating phases of intensity and recovery — is therefore essential to prevent injury.

Nutrition and hydration also play a crucial role.

A nutrient-rich, balanced diet with appropriate vitamin and mineral intake supports joint health, hoof quality, and muscle recovery. Hydration is equally vital: even mild dehydration can shorten stride length, reduce tissue oxygenation, and slow post-exercise repair.

In addition to the physical dimension, the horse's mental state is an integral part of performance.

Chronic stress elevates cortisol levels, weakens the immune system, and induces muscle tension, impairing focus. Structured routines, moments of freedom, and a calm environment help maintain psychological balance, improving willingness and performance potential.

Performance, therefore, is never the result of a single factor but of an interconnected network of elements: genetics and anatomy, training and recovery, nutrition and hydration, mental balance and environment.

Osteopathy serves as a bridge between these dimensions, maintaining harmony between structure and function.

Only through this integrated approach can one achieve excellent, sustainable performance that enhances the horse's natural abilities while ensuring long-term health and well-being.

Advanced Anatomy and Biomechanics

The understanding of equine anatomy and biomechanics is the result of centuries of observation, study, and intuition.

During the Renaissance, the Bolognese anatomist Carlo Ruini published *Anatomia del Cavallo* (1598), the first complete treatise dedicated to this animal — a remarkable scientific achievement for its time. Even earlier, Leonardo da Vinci had produced meticulous drawings of horses in motion and at rest, highlighting the synergy between muscular power and joint elegance.

In the nineteenth century, photographer Eadweard Muybridge made a decisive contribution: through high-speed photographic sequences, he demonstrated that during the gallop there is a moment when all four hooves leave the ground, revolutionizing the understanding of gait dynamics and inspiring modern motion analysis.

Today we know that the adult horse is a marvel of biological engineering, with about 205 bones and over 700 muscles working in perfect coordination.

The skeleton is divided into two main sections:

- The axial skeleton, comprising the skull, spine, ribs, and pelvis, provides stability and forms the central axis for movement.

- The appendicular skeleton, consisting of the forelimbs and hind limbs, generates propulsion and absorbs impact, transforming muscular energy into smooth locomotion.

The natural gaits (walk, trot, canter, and gallop) represent a biomechanical symphony. Each gait has its own sequence of limb placement and energy requirement.

At the gallop, the complete suspension phase marks the moment of maximum hindlimb power.

Tendons such as the superficial and deep digital flexors act like biological springs, storing and releasing elastic energy to minimize energy expenditure.

Coordination between the fore and hind limbs is orchestrated by the central nervous system and proprioceptive receptors, which continuously send information about position and muscle tension.

However, this intricate mechanism is not immune to stress. Sport horses subjected to intense training and frequent travel for competitions experience significant physical and psychological load.

From a musculoskeletal standpoint, articular manipulations and soft-tissue work help reduce motion restrictions and restore proper alignment of the spine and pelvis, thereby improving biomechanical efficiency.

Fascial release optimizes lymphatic drainage and reduces inflammation, while stimulation of mechanoreceptors enhances proprioception and neuromotor coordination.

Prevention remains a fundamental pillar: early detection and correction of mechanical dysfunctions limit the risk of overload injuries and microtraumas.

Post-competition treatments promote muscle relaxation, peripheral circulation, and tissue repair, allowing a faster and safer return to training.

Often, after an osteopathic session, horses display clear signs of relaxation — softer eyes, deeper breathing, a more supple posture — indicating improved overall well-being and sleep quality.

Scientific Evidence

The scientific literature on equine osteopathy, although still relatively young, is steadily growing.

Several case series have documented improvements in horses with sacroiliac, lumbar, or limb dysfunctions, reporting decreased lameness and enhanced performance as observed by veterinarians and owners.

Small-scale randomized studies have measured objective parameters such as spinal stiffness or stride length, reporting significant benefits when osteopathic manipulations were combined with mobilization protocols.

Controlled experiments have also demonstrated changes in autonomic nervous system tone, inflammatory markers, and pain thresholds, suggesting that osteopathy's effects extend well beyond simple joint mobility enhancement.

Overall, current evidence supports the idea that equine osteopathy can improve joint mobility, muscular elasticity, and neuromuscular coordination — all crucial elements for athletic performance.

The practical implications are clear:

For osteopaths, integrating treatments into conditioning programs represents a preventive and effective strategy.

For owners and trainers, scheduling regular osteopathic evaluations helps reduce injury risk, shorten recovery times, and promote overall equine well-being.

A collaborative approach involving the veterinarian, osteopath, trainer, and farrier ensures comprehensive monitoring and timely intervention, creating a truly integrated care plan.

Over the years, several studies have provided concrete evidence of osteopathy's efficacy. For instance, Thoresen (2009) examined a sample of 374 horses with poor performance and sacroiliac or hip dysfunctions, often accompanied by back pain: after a series of osteopathic treatments, over 80% showed improvement in stride symmetry, pain reduction, and competition quality at all levels.

Another study focusing on Warmblood horses with thoracic, lumbar, or back muscle issues documented that spinal manipulations (chiropractic or structural therapy) could produce significant and long-lasting changes in thoracolumbar range of motion and pelvic symmetry, observable within weeks after treatment.

Finally, a study on Andalusian horses demonstrated that osteopathy significantly increased overall stride angulation at the trot compared to baseline, even though the variations in forelimb and hindlimb angles did not reach statistical significance.

Conclusion

In conclusion, continuous and personalized equine osteopathy appears capable of optimizing joint mobility and musculoskeletal function, supporting post-competition recovery, and reducing the risk of overload and microtrauma.

These results translate not only into higher athletic performance but also into greater longevity of the equine athlete.

Future research should involve larger samples, examine inter-breed differences, and investigate performance parameters such as speed, power, and endurance, in order to consolidate the integration of osteopathy within evidence-based veterinary medicine.

Through this approach, the equestrian community can help horses reach their highest potential while preserving their health and well-being over the long term.