# The Efficacy of Osteopathic Techniques in Managing Sacroiliac Dysfunction in Horses: A Comparative Analysis with Joint Injections

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## Abstract

This thesis explores the efficacy of osteopathic techniques in managing sacroiliac dysfunction in horses, particularly when joint injections have proven unsuccessful. The study compares osteopathic treatment outcomes with conventional joint injections, highlighting each approach's potential benefits and limitations. The findings suggest that osteopathic techniques can significantly improve pain relief, mobility, and overall performance in horses with sacroiliac dysfunction.

*Keywords*: Osteopathy, sacroiliac joint, sacroiliac dysfunction, joint injections, OMT, Craniosacral therapy, HVLA

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The sacroiliac (SI) joint is a vital component of the horse's hindquarters, facilitating the transfer of hind leg movement to the back and converting propulsion into forward motion. SI dysfunction can significantly impair a horse's performance and quality of life.

Although joint injections are commonly used to treat SI dysfunction, their effectiveness is often limited, with some horses showing no improvement. This thesis seeks to evaluate the effectiveness of osteopathic techniques as an alternative or complementary approach, comparing their efficacy to joint injections and exploring the potential advantages of integrating osteopathic treatments into routine veterinary care.

## Equine sacroiliac anatomy

The SI joint is a synovial joint with limited movement, formed where the front of the iliac wing connects to the fused transverse processes of the sacrum (Stack & Harley, 2021). This joint and substantial soft tissues transfer forces between the hind limbs and the axial skeleton. The complex anatomy and biomechanics of the SI joint make it a challenging area to diagnose and treat.

The SI joint, located in the horse's hindquarters, connects the pelvis to the spine. Several ligaments stabilize it, including the sacroiliac interosseous ligament, the dorsal sacroiliac ligament, and the ventral sacroiliac ligament (Stack & Harley, 2021; Key, n.d.). The ligaments integrate with key fascial structures and ligaments of the back and pelvis, including the thoracolumbar fascia and the sacrosciatic ligaments. (Engeli et al, 2006). Several muscles, such

as the long head of the semimembranosus, middle gluteal, and biceps femoris, connect to different parts of this fascial network. (Goff et al, 2008).

The SI joint displays a limited and complex range of motion, approximately 2°, compared to the adjacent lumbosacral junction, which undergoes 10 times this range of motion (flexion/ extension) (De Guerce et al, 2004; Goff et al, 2008). This limited motion is crucial for the stability and function of the joint. The SI joint channels the driving forces from hindlimb movement, experiencing shear forces during propulsion (Stack & Harley, 2021). This joint is stabilized by the longissimus dorsi muscles contracting to cause lumbosacral extension, and the rectus abdominis muscles contracting to cause lumbosacral flexion (Denoix, 1999).

## Sacroiliac dysfunction in horses

SI dysfunction (SID), a term borrowed from human medicine, refers to the clinical signs of reduced performance and abnormal hindlimb gait in horses, linked to pain and dysfunction originating from the sacroiliac joint. SID can result from numerous factors, including trauma, repetitive stress, overuse injuries, poor conformation, or arthritis. The term dysfunction suggests irregular or abnormal movement in the joint.

> "A recent review of the human literature defines SID as pain and stiffness attributable to abnormal motion of the joint, resulting in either hypo- or hypermobility" (Walter et al, 2024, para. 9).

The condition involves pain and dysfunction, but its cause and nature remain unclear, including whether SI dysfunction involves abnormal joint pathology, movement, regional biomechanics, joint laxity, pain, or a combination of these that may change over time. Common clinical signs of SI dysfunction include poor-quality gaits, refusing jumps, bunny hopping in the canter, and low-

grade lameness. These signs are often subtle and overlap with other orthopedic conditions, making diagnosis challenging (Key, n.d.; Walter et al, 2024).

Another aspect to consider when discussing SID is the distinction between dysfunction and pathology, and determining when dysfunction transitions into pathology.

> "The human literature recognizes that SID can occur without associated pain. It is possible that horses may also have an abnormal SI joint structure and or abnormal movement within the joint, but this may not necessarily be painful" (Walter et al, 2024, para. 10).

There is likely a clinical progression where painless dysfunction occurs early, later developing into painful dysfunction. Additionally, pain may lessen at times, while joint movement dysfunction persists. This affects clinical diagnosis, as some methods focus on pain responses, while others evaluate joint structure through imaging (Walter et al, 2024).

## Sacroiliac dysfunction diagnosis

The diagnosis of SI dysfunction in horses is complex due to the deep location of the sacroiliac joint and surrounding structures, which limits access for palpation, diagnostic imaging, and joint-specific injection (Barstow & Dyson, 2015; Goff et al, 2008). There is no recognized single reference standard diagnostic test for SI dysfunction (Stack & Harley, 2021). Clinical diagnosis is often based on ruling out other causes of hind limb lameness and combinations of ultrasonography, scintigraphy, and periarticular anesthesia of the joint (Walter et al, 2024; Goff et al, 2008). Advanced imaging modalities such as computed tomography offer promise for assessing the structure and pathology of the SI joint and surrounding bony structures. (Walter et al, 2024)

Horses suspected of having sacroiliac dysfunction typically show a gradual onset of poor performance, including reduced hindlimb power, decreased jumping arc, stiffness in the back or hindquarters, reluctance to sustain canter, and difficulty cantering on the correct lead (Walter et al, 2024; Jeffcott et al, 1985; Dyson & Murray, 2003; Barstow & Dyson, 2015). Stronger use of rider aids may trigger bucking (Bartow & Dyson, 2015). Some horses with sacroiliac joint pain resist hind limb farriery when forced to stand on one limb for extended periods (Walter et al, 2024; Jeffcott et al, 1985; Bartow & Dyson, 2015).

Sacroiliac dysfunction often accompanies other lameness issues. In a study of 296 horses diagnosed with SID using periarticular anesthesia and scintigraphy, only 43 (14.5%) had SID alone, while the others had exhibited other musculoskeletal problems, such as hindlimb or forelimb lameness, thoracolumbar back pain, some with more than one of these conditions (Walter et al, 2024; Barstow & Dyson, 2015). Horses suffering from sacroiliac joint pain frequently exhibit muscle atrophy in the lumbar and hindquarter regions along with asymmetry of the pelvic bones (Stack & Harley, 2021). However, these symptoms are not unique to sacroiliac issues, as horses with facet pain or thoracolumbar dorsal spinous process impingement (kissing spines) may display similar symptoms (Stack & Harley, 2021; Girodroux et al, 2009).

Dysfunction in a horse's SI joint can cause issues in other body parts. When a horse experiences SI dysfunction, it often compensates by altering its posture and movement patterns (Stack & Harley, 2021; Key, n.d.). This compensation can lead to tension and strain in other areas, including the neck and poll. When the SI joint is painful or restricted, the horse may change its gait and posture to avoid discomfort. This can lead to uneven weight distribution and increased strain on other areas of the body. The altered movement patterns can cause tension and tightness in the horse as it tries to balance and stabilize itself. The strain and tension can lead to

secondary pain and discomfort, further affecting the horse's overall performance and behavior (Pusey et al., 2010).

> "It is especially true with quadrupeds that each individual part of the body affects the entire animal. Each muscle group must coordinate with all other muscle groups and ligaments to enhance the overall working of the horse." (Ballou, 2009).

A study on back kinematics in lame horses found that resolving lameness increased flexion, extension, lateral bending, and rotation in the thoracolumbosacral spine (Greve et al, 2017). This is important as it highlights the need for a thorough evaluation of the appendicular musculoskeletal system in horses with back stiffness, suggesting that lameness in the limbs affects the mechanics of the spine and may contribute to back pain (Alvarez, 2007).

## Sacroiliac injections

In equine healthcare, joint injections are frequently used to ease pain and support recovery in injured horses. Conventional treatments for SI dysfunction include joint injections, temporarily relieving inflammation and pain (Stack & Harley, 2021). Corticosteroids are frequently used in joint injections for humans and horses and are valued for their anti-inflammatory properties. However, the effects are a double-edged sword. While they reduce inflammation and immune responses, the wide-ranging impact can damage healthy cells and tissues, leading to several harmful side effects (Hauser & Steinlin-Matias, 2024).

The benefits of SI injections are that they allow targeted treatment of the affected area, delivering medication directly to the site of inflammation or pain (Oke, 2021). These injections can relieve pain significantly, improving the horse's comfort and performance. Corticosteroids in

SI joint injections help reduce inflammation, alleviate symptoms, and improve joint function (Miki, 2024). SI joint injections can also be used diagnostically to confirm the source of pain by observing the horse's response to the injection. Compared to surgical options, SI joint injections are minimally invasive and can be performed relatively quickly. (Oke, 2021)

Equine athletes, whose performance depends on musculoskeletal health, are at increased risk of joint degradation after receiving corticosteroid injections. Repeated injections can worsen pre-existing injuries, potentially shortening competitive careers and negatively impacting overall health (Miki, 2024). The relief provided by SI joint injections may be temporary, requiring repeated treatments. There is a risk of complications such as infection, joint damage, or adverse reactions to the medication (Oke, 2021; Miki, 2024). Achieving accurate injection placement can be challenging due to the complex anatomy of the SI joint, leading to potential dispersal of the medication to surrounding structures (Engeli & Haussler, 2011; Miki, 2024). Repeated injections can potentially damage the SI joint itself. This can lead to further complications and exacerbate the existing condition. Over time, repeated injections can weaken the structures around the SI joint, including ligaments and tendons. This can lead to instability and an increased risk of injury (Hauser & Steinlin-Matias, 2024; Miki, 2024).

Like human medicine, joint injections can carry intricate risks and potential complications that warrant caution. Additionally, joint injections may not address the underlying issues and can have limited long-term efficacy. Recent studies have highlighted the lack of specificity of injections targeting the SI joint, with significant dispersal of injectate into surrounding structures, including around the lumbosacral joint (Walter et al, 2024). While injections can provide symptomatic relief, they may not address the underlying cause of the dysfunction, potentially masking more serious issues. Repeated injections can become costly,

especially if the horse requires ongoing treatment (Oke, 2021). The relief provided by SI joint injections may diminish over time, requiring more frequent treatments. This can lead to a cycle of dependency on injections without addressing the root cause of the dysfunction (Mehta, 2023).

## Osteopathic therapies

Osteopathy, rooted in structural integrity and functional optimization principles, has been adapted from human medicine to treat equine musculoskeletal disorders. It emphasizes manual techniques to restore joint mobility, alleviate pain, and improve biomechanical function. Osteopathic therapies emphasize a holistic, patient-centered approach to health care. It views the body as an interconnected system, where all the parts work together to maintain health and heal from illness. Osteopathic techniques, such as manual therapy, aim to restore normal, pain-free joint mobility and improve overall function and general health. (Pusey et al., 2010) These methods tackle the root biomechanical problems and enhance the horse's overall health. Osteopathic treatments have demonstrated potential in addressing SI dysfunction, especially when traditional approaches have failed (Thoresen, 2009).

Osteopathic manual treatment (OMT) targets the symptoms and causes of SI dysfunction. This approach considers the entire musculoskeletal system, resulting in effective and long-lasting results. OMT is a non-invasive and drug-free therapy, making it a safer alternative to more invasive treatments like injections or surgery. This reduces the risk of side effects and complications, providing a gentler option for horses (Pusey et al., 2010). OMT also aims to improve the mobility and function of the horses' skeleton, muscles, ligaments, and joints. By restoring normal, pain-free joint mobility, horses can experience enhanced performance and overall well-being (Powers, 2023).

Previous research has demonstrated the potential of OMT in addressing equine lameness and gait abnormalities, particularly in cases unresponsive to standard veterinary interventions. For instance, a study of 51 horses with chronic lameness found that OMT improved gait and reduced stiffness, suggesting its legitimacy in managing somatic dysfunction (Colles et al, 2014). Additionally, therapeutic exercises targeting SIJ stability, such as dynamic mobilization and gymnastic training, have shown promise in enhancing stride quality and epaxial muscle size (Murray et al., 2020). Horses receiving OMT often show improvements in their performance, including better gait quality, increased flexibility, and enhanced strength. This is particularly beneficial for competitive horses that require optimal physical condition (Powers, 2023). By addressing the root causes of SI dysfunction and improving overall musculoskeletal health, OMT can help prevent the recurrence of issues. This proactive approach can lead to fewer injuries and a longer, healthier career for the horse (O'Shea, 2024).

Craniosacral therapy (CST) for horses is a gentle, hands-on technique that focuses on the craniosacral system, which includes the bones of the skull, spine, and sacrum, as well as the membranes and cerebrospinal fluid that surround and protect the brain and spinal cord. The goal of CST is to release tension and restrictions in this system to improve the overall health and well-being of the horse. CST can help alleviate pain and discomfort and enhance the horse's range of motion and flexibility. The gentle nature of CST can help calm and relax the horse, reducing stress and anxiety. It can aid in the recovery process from injuries or surgeries by promoting the body's natural healing mechanisms (Kanik et al, 2017).

While OMT and CST can offer significant benefits for managing SI joint dysfunction in horses, weighing the potential drawbacks and considering a holistic approach to the horse's health and well-being is important. While there is anecdotal evidence and some studies

supporting the efficacy of OMT, there is still a need for more rigorous scientific research to establish its effectiveness and safety conclusively. The success of OMT largely depends on the skill and experience of the practitioner. Inexperienced or poorly trained practitioners may not achieve the desired results and could potentially cause harm. Following OMT sessions, some horses, like humans, may experience temporary discomfort or soreness. This is usually short-lived but can concern some owners (Hu, 2015). OMT may not address all underlying issues contributing to SI joint dysfunction. It is often most effective in a comprehensive treatment plan with other therapies and interventions (Roberts et al., 2022). There is a risk of over-reliance on OMT, potentially neglecting other important aspects of the horse's care, such as proper conditioning, nutrition, and veterinary care (Pusey, 2010).

OMT can be used alongside traditional veterinary treatments, providing a complementary approach to managing SI dysfunction. This integrated method can enhance the overall effectiveness of the treatment plan (Roberts et al., 2022). Each horse is unique, and OMT allows for personalized treatment plans tailored to the specific needs and conditions of the individual horse. This customization ensures that the therapy is as effective as possible.

## Osteopathic efficacy research

A study by Annica Nygren Thoresen (2009) thoroughly investigates the efficacy of osteopathic manipulations in improving the performance of horses with SI dysfunction. This review contextualizes the study within the broader literature on equine osteopathic manipulations, sacroiliac and hip joint dysfunction, and their impact on performance, while critically evaluating its contributions, methodologies, and limitations. This review also incorporates relevant findings from related studies to provide a comprehensive analysis.

Thoresen (2009) conducted a retrospective case series involving 374 horses treated exclusively with OMT for poor performance attributed to suspected SIJ and/or hip joint dysfunction and back pain between 2006 and 2007. The study population primarily consisted of horses previously examined for lameness (92%) and treated with intra-articular medications without success (78%). The primary findings included restricted mobility in the hip joints (87%) and SIJ (75%), with 316 horses receiving three or more OMT sessions spaced 2 to 4 weeks apart. Outcomes were assessed based on clinical improvements, such as the absence of lameness, gait asymmetry, back pain, or stiffness, and performance metrics, including race times and competition levels. The study reported a positive outcome in 80% of cases (298 horses), with only 4% (15 horses) showing no improvement.

The authors also measured the mechanical nociceptive threshold using an algometer at specific spinal points (T14-T15, T18-L1, L5-L6) to quantify pain reduction post-treatment. Cranial osteopathic therapy increased the nociceptive threshold in 83.3% of measured points in horses without back pain and 50% in those with back pain, indicating a positive response to OMT.

This study's large sample size (374 horses) provides ample data compared to smaller case studies, such as the 51-horse study by Colles et al. (2010). Including horses from various disciplines allows for extrapolating findings across equestrian contexts. Using objective outcome measures, such as algometry for pain assessment and performance metrics (e.g., race times, competition levels), adds credibility and objectivity when evaluating OMT efficacy. The requirement for multiple treatment sessions (3 or more) aligns with osteopathic principles, emphasizing manual therapy's cumulative effects to restore biomechanical function. The focus on horses unresponsive to conventional treatments highlights OMT's potential as a

complementary therapy for those cases resistant to other treatments. This is consistent with human studies, where manual therapies like manipulation and exercise are recommended for chronic low back pain where pharmacological interventions fail (Franke et al, 2014). The high percentage of positive outcomes suggests that osteopathic treatments can be an effective alternative or complementary approach to traditional veterinary treatments.

Thorensen's (2009) study has some clear strengths, but it is also not without flaws. Since it is retrospective, it utilizes previous health records and observations, which can limit the consistency of information between cases in the study. It lacks a control group, making it difficult to attribute improvements solely to OMT. This can introduce biases and inaccuracies in the data collection and analysis. The study did not provide long-term follow-up data to assess the durability of the treatment effects. It is unclear how long the positive outcomes persisted after the treatments. Spontaneous recovery, placebo effects, or concurrent management changes (e.g., training adjustments) could confound outcomes. Randomized controlled trials (RCTs), such as those in human osteopathy, provide stronger evidence by controlling such variables (Hariton & Locascio, 2018). The absence of blinding and outcome assessments introduces potential biases, particularly since metrics like competition levels are subjective and influenced by rider or trainer perceptions.

Diagnostic criteria for SIJ and hip joint dysfunction were based on clinical findings (restricted mobility) rather than advanced imaging or definitive diagnostic blocks, which offer more objective findings. The study notes that 92% of horses had prior lameness evaluations, but the lack of standardization in these assessments limits diagnostic precision. Recent reviews highlight the limitations of clinical diagnosis for equine SIJ dysfunction, advocating that

imaging, such as computed tomography, plays a complementary role in diagnosing SIJ (Stack & Harley, 2021).

While an objective measure, the study's use of algometry for pain assessment is limited by specific spinal points rather than the SIJ or hip joint. The reported increase in pain thresholds is encouraging but requires validation against other pain assessment methods, such as behavioral scoring or kinematic analysis. Additionally, the study does not detail the specific OMT techniques used, making reproducibility challenging. Comparative studies in human osteopathy emphasize the importance of specifying techniques, as efficacy varies between methods like high-velocity articulations (HVLA) and soft tissue techniques (Fryer et al, 2009; Pusey et al., 2010).

The study found that a significant percentage of horses showed positive outcomes, including improved personal race times, race earnings, and higher training and competition levels. This suggests that osteopathic manipulations can enhance the overall performance of horses, making them more competitive in their respective disciplines (Thoresen, 2009).

Osteopathic manipulations can effectively reduce pain and discomfort associated with sacroiliac and hip joint dysfunction and back pain. This can improve the quality of life for horses and allow them to perform at their best. Regular osteopathic treatments can help prevent the recurrence of issues by maintaining proper joint mobility and overall musculoskeletal health. This proactive approach can reduce the risk of injuries and prolong the horse's athletic career (Haussler, 2010).

The practical implications in this study highlight osteopathic manipulations as a successful alternative or complementary treatment to traditional veterinary methods. Osteopathic treatments focus on the whole body, addressing dysfunction symptoms and underlying causes.

This holistic approach can lead to more comprehensive and long-lasting improvements in the horse's health and performance (Seffinger, 2018). The study also stresses the importance of collaboration between veterinarians and osteopathic providers. Working together can provide a more comprehensive and effective treatment plan for horses with musculoskeletal issues (Pusey et al., 2010).

Thorensen (2009) emphasizes the need for a deep understanding of equine anatomy, biomechanics, and pathology to apply osteopathic techniques correctly. It stresses that proper education and training for osteopathic practitioners are necessary to deliver safe and successful osteopathic manipulations. These practical implications suggest that incorporating osteopathic manipulations into equine healthcare can benefit horses with SI and hip joint dysfunction and back pain, leading to improved performance, pain relief, and overall well-being.

The findings of Thoresen (2009) align with other research on equine OMT. For example, Colles et al. (2014) reported that OMT improved gait abnormalities in 51 horses with chronic lameness, supporting that somatic dysfunction contributes to persistent lameness. Similarly, therapeutic exercises for SIJ pain, such as pelvic tilting and dynamic mobilization, have been shown to enhance stride length and muscle size, complementing the biomechanical goals of OMT (Goff et al, 2010). However, these studies also lack control groups, highlighting a gap in equine osteopathy research.

In human medicine, OMT is supported by RCTs demonstrating efficacy for acute low back pain, with manipulation sometimes outperforming exercise. The equine literature lags in this regard, with most studies, including Thoresen (2009), relying on observational designs. Human studies also highlight the diagnostic challenges of SIJ pain, advocating for a combination of OMT and diagnostic injections. The equine field could benefit from adopting similar

multimodal diagnostic approaches, though practical constraints (e.g., cost, accessibility of imaging) remain barriers.

The reported 80% positive outcome rate in Thoresen (2009) is comparable to human studies, where SIJ manipulation achieves pain relief in 70 to 85% of cases. However, the equine study's broader outcome measures (e.g., performance improvement) make direct comparisons complicated. The emphasis on hip joint dysfunction (87% prevalence) is notable, as equine literature often prioritizes SIJ pathology. This finding warrants further investigation, particularly given the biomechanical relationship between the hip and SIJ.

## Conclusion

Osteopathic manipulations have shown significant promise in improving the performance and well-being of horses with suspected sacroiliac and/or hip joint dysfunction and back pain. This thesis provides valuable insights into the efficacy of osteopathic treatments and underscores the importance of considering alternative therapies in veterinary practice. In summary, osteopathic manual treatment offers a range of advantages for managing SID in horses. Its holistic, non-invasive, and personalized approach can significantly improve mobility, pain relief, and overall performance, making it a valuable option for equine health care.

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