Sacroiliac Injuries in Horses

Jennifer Lorenz, DVM
Sabrina H. Brounts, DVM, MS, DACVS, DECVS
University of Wisconsin-Madison

Abstract: This article reviews the pathology, diagnosis, and treatment of sacroiliac joint injuries. These injuries can be acute or chronic and can involve soft tissue structures surrounding the joint or the bony structures of the joint. The several diagnostic modalities for sacroiliac injuries vary in usefulness and accessibility. Treatment of sacroiliac problems is usually supportive and nonspecific and includes the use of antiinflammatory medications and an appropriate exercise regimen. The prognosis depends on the cause, but severe injuries can limit a horse’s future athletic activity.

Sacroiliac pain in horses is difficult to diagnose. The inaccessibility of the joint and its ligaments, combined with the anatomy of the surrounding structures, makes it hard to visualize the joint and the associated pathology.1–3 The low-grade lameness and variable clinical signs associated with sacroiliac pain make it difficult for veterinarians, owners, and riders to recognize a problem. The literature on sacroiliac pain can be confusing, and research on this subject is limited, so understanding of sacroiliac joint injuries is extrapolated from joint and tendon injuries in other articulations in the body.2

The Sacroiliac Joint: Anatomy and Function

The sacroiliac joint is a small articular space between the ventral wing of the ilium and the dorsal wing of the sacrum. On the sacral articular surface, there is hyaline cartilage; on the ilial articular surface, there is fibrocartilage. The sacroiliac joint is typically L shaped, with the convex border directed caudoventrally. The joint holds 0.5 to 1 mL of synovial fluid. However, because of surface remodeling, the size and shape of the joint can vary with age and weight.4 The sacroiliac joint attaches the pelvis to the axial skeleton and provides support during weightbearing by transferring propulsive forces of the hindlimb to the vertebral column. The joint is expected to undergo shear forces more than compressive forces, with minimal flexion and extension.2,5–7

Ligaments of the joint include the dorsal sacroiliac ligament, which has dorsal and lateral portions; the interosseous sacroiliac ligament; and the ventral sacroiliac ligament. These ligaments and the sacrosacral ligament form a sling that attaches the pelvis to the axial skeleton (FIGURE 1; FIGURE 2).

The sacroiliac joint is associated with the middle and accessory gluteal muscles, the internal obturator muscle, and the iliacus muscle. Other significant anatomic structures near the joint are the sciatic nerve and the cranial gluteal nerve, artery, and vein. These structures run through the greater sciatic foramen ventromedial to the sacroiliac articulation.2,8 It is important to be aware of these structures to minimize complications associated with some diagnostic procedures and treatments.

Pathology

The pathology of sacroiliac joint injuries may involve the joint itself or soft tissue structures surrounding it. Osteoarthritis is the most prevalent cause of sacroiliac joint injury, resulting in articular surface lipping, cortical buttressing, articular recession, osteophyte formation, and intraarticular erosion.2,7,9,10 These problems are often bilaterally symmetric and may be due to chronic instability
of the sacroiliac joint. The most common soft tissue injury of the sacroiliac joint is sacroiliac ligament desmitis, which may contribute to joint instability.\(^2,1\) The dorsal portion of the dorsal sacroiliac ligament seems to be affected most often, showing loss of normal echogenicity and a decrease in parallel fiber pattern on ultrasonography. Disruption of the ligaments increases joint instability, possibly resulting in subluxation and pain.\(^5\)

**Clinical Presentation**

**Signalment**

Horses with sacroiliac pain are generally tall, heavy, and/or older.\(^2,1\) In addition, horses used for dressage or jumping are more likely to present with sacroiliac pain. Other horses considered to be at high risk for developing sacroiliac pain are harness racehorses, draft breeds, carriage horses, endurance horses, and western pleasure horses.\(^3,2,12\)

**Clinical Signs**

Clinical signs of sacroiliac pain vary depending on the pathology, ranging from severe lameness to lameness with a more insidious onset.\(^2,7,12,14\) Patients with acute sacroiliac injuries and a history of a traumatic incident may have an obvious gait abnormality and localized sensitivity in the sacroiliac region. There has been some controversy regarding the clinical significance of tuber sacrale height symmetry in sacroiliac pathology. In the past, asymmetry of the tubera sacrale was considered a clinical sign of sacroiliac pathology. The asymmetry has been attributed to subluxation of sacroiliac joints, but there has been little evidence to support this theory because some clinically normal horses have a degree of asymmetry.\(^2\) A diagnosis of acute sacroiliac joint subluxation can be confirmed only if asymmetry of the tubera sacrale was not present before the traumatic incident and pain is elicited in that region. Other causes of tuber sacrale asymmetry include under-development of muscle masses or fracture of the ilial wing.\(^7,12,14\)

In chronic sacroiliac joint injuries, the most consistent clinical signs are a history of poor performance, lack of impulsion, and mild, intermittent hindlimb lameness or stiffness.\(^2,12–15\) Affected horses may have a straight hindlimb flight in their gait or a shuffling, plaiting, or rope-walking gait. These horses may be reluctant to stand on the affected limb during flexion of the unaffected limb during lameness examinations or shoeing. Other signs include a change in behavior, such as an unwillingness to work, difficulty working on the bit, refusing jumps, or difficulty moving laterally.\(^12,16\) Signs may be more prominent when the horse is being ridden and worked hard. Other concurrent clinical features of chronic sacroiliac joint problems include other forelimb or hindlimb lameness and a poorly muscled back.\(^2,12–15\)

Some specific provocation tests (also known as stress tests) can help identify the sacroiliac region as a problem during physical examination of the back.\(^2\) For example, the clinician can apply gradual manual pressure to certain regions of the body to evaluate the horse's response. In one test, ventral pressure is applied to the dorsal aspect of each tuber sacrale. This test is not specific for sacroiliac pain because horses with pelvic fractures can also show a dramatic pain response (i.e., collapse of the hindlimbs) to it. In another test, ventral pressure is applied over the lumbosacral dorsal spinal processes or to each tuber coxae. This test induces motion in the sacroiliac and lumbosacral areas, which stresses the sacroiliac ligament. A third test stresses the sacroiliac joint and surrounding ligaments: the clinician applies horizontal pressure to the ipsilateral tuber sacrale with one hand while pulling the tailhead toward himself/herself with the other hand. The test is then repeated by reversing the direction of the forces: the clinician pulls the contralateral tuber sacrale toward himself/herself with one hand while pushing the tailhead away from himself/herself with the other hand. In a variation of the third test, pressure can also be applied to the ischial tuberosity instead of the tuber sacrale. Horses with sacroiliac pain show resentment toward one or all of these tests. Further diagnostic testing can be used to confirm that the sacroiliac region is the source of pain.

**Diagnosis**

Several modalities can help diagnose sacroiliac joint pathology. Any horse suspected of having sacroiliac pain should undergo a thorough workup to rule out potential causes of the clinical signs. Regional anesthesia, radiography, ultrasonography, nuclear scintigraphy, thermography, pressure algometry, and kinematic evaluation have all been described as useful modalities for diagnosing sacroiliac joint pathology.\(^2,17–34\) It may be necessary to use more than one of these modalities, and even then, it may be difficult to reach a definitive diagnosis.

**Intraarticular/Periarticular Anesthesia**

Intraarticular anesthesia of the sacroiliac joint is nearly impossible because of limited access due to the overlying musculature. However, periarticular anesthesia of the sacroiliac joint can be of great
Sacroiliac Injuries in Horses

benefit for diagnosing or treating sacroiliac pain.2,17,18 Other cranial and caudal approaches have been unreliable and have increased risk of neurologic problems, such as hindlimb paresis.12,17 After the horse is restrained and sedated and the surgical site prepared, a 10-inch (25-cm), 16- or 18-gauge spinal needle bent 40° in the direction of the needle's bevel is placed about 1 inch cranial to the contralateral tuber sacrale. The spinal needle is then inserted at 60° to the vertical plane. The needle is advanced across midline, aiming for a point midway between the ipsilateral tuber coxae and the greater trochanter of the femur, until the needle shaft encounters the medial aspect of the ipsilateral tuber sacrale. The needle is then advanced at a steeper angle and should slide along the medial aspect of the ilial wing for 15 to 20 cm until it engages the dorsal surface of the sacral wing (FIGURE 3A; FIGURE 3B). The stylette is then removed, and the injection can be performed. It is important for the horse to stand still and square during the procedure. Variations in the angles of the dorsal spinous processes at the lumbo-sacral junction may impede advancement of the needle, but it is possible to move the entry site of the needle a few centimeters cranial or caudal to avoid these structures.17 Ultrasound guidance during the procedure may help identify the caudomedial aspect of the joint and any neurovascular structures.18

Radiography

Radiography of the pelvis is of limited use for diagnosing sacroiliac joint disease. Radiographs are difficult to obtain in this region; presumably normal horses could have major differences in sacroiliac joint shape, and changes to the sacroiliac joint can be minimal with chronic disease.2,19,20 Radiographic evaluation of the sacroiliac joint is problematic because the joint has a sloped appearance and the abdominal viscera are superimposed on the area of interest.20 Radiographic features that can be seen are osteophyte formation on the caudal aspect of the joint and irregular joint space width. Because of the variability in radiographic appearance among horses, radiography alone should not be used to diagnose sacroiliac joint disease.20

Ultrasonography

Ultrasonography can help diagnose sacroiliac disease by revealing soft tissue structures and osseous changes. Transrectal and transcutaneous approaches have been described in the literature.21–23 The dorsal sacroiliac ligament and bony margins of the sacrum and ilium can be visualized transcutaneously, whereas transrectal examination can determine the angle and width of the joint space. Soft tissue structures should be evaluated for differences in shape, thickness, and fiber pattern compared with the contralateral side. In acute cases, the dorsal sacroiliac ligament can be enlarged and can have decreased echogenicity with decreased linear fiber patterns. In chronic cases, the affected dorsal sacroiliac ligament can be smaller than the contralateral ligament. Calcifications in the ligament may also indicate a chronic injury.21,22 Bony structures should be evaluated for roughness or discontinuity; however, these findings should be interpreted cautiously. Sacroiliac joint malalignment, fractures, and irregular bony structures can be noted; however, bone irregularity at the sacral dorsal spinous

Figure 3. (A) Position of a spinal needle for a sacroiliac injection. (B) Close-up of the needle position near the sacroiliac joint.
process has been seen in normal horses, and young horses may have an open physis or a secondary apophyseal ossification center that could be confused with a pathologic process.\textsuperscript{23} While ultrasonography is useful for diagnosis, its findings should be interpreted in combination with those from other diagnostic modalities to differentiate between sacroiliac joint disease and other causes of poor performance. A poor correlation between ultrasonographic findings and other findings has been reported.\textsuperscript{24}

**Nuclear Scintigraphy**

Nuclear scintigraphy has been described as a sensitive and useful diagnostic tool for identifying sacroiliac joint injuries. Several articles have described normal and abnormal findings of nuclear scintigraphy as well as techniques for interpreting images.\textsuperscript{25–29} Detection of marked left-right asymmetry over the tubera sacrale and sacroiliac joint was helpful in identifying horses with clinical signs of sacroiliac joint disease.\textsuperscript{27–28} A dorsal view of the sacrum is the most diagnostic image for evaluating the sacroiliac joint. Oblique views of the ilial wings are recommended for distinguishing the tuber sacrale from the sacroiliac joint; nevertheless, the images may be difficult to interpret. Age-related changes can influence image analysis; therefore, comparisons between normal horses and horses with abnormalities should involve horses of similar age.\textsuperscript{27,28} Other factors that have been found to alter radiopharmaceutical activity are asymmetry in the pelvis, a thick overlying muscle mass, the orientation of the pelvis, and the distance between the camera and the bones.\textsuperscript{26,27} Although nonspecific for identifying the type of injury, nuclear scintigraphy is sensitive for confirming the diagnosis. Like other diagnostic modalities for sacroiliac joint injuries, nuclear scintigraphy is not considered to be a standalone diagnostic. However, in combination with clinical examinations and other diagnostic modalities, it is highly likely to help diagnose sacroiliac joint disease.

**Infrared Thermographic Imaging**

The use of thermography has been described in diagnosing lameness and chronic back pain in horses.\textsuperscript{30,31} In patients with chronic back pain, thermography shows affected areas as “cold” regions rather than “hot” spots, which indicate inflammation. The cold regions are created by regionalized hypothermia due to vasoconstriction at the site of pain. Thermography is best used as a screening or complementary tool in combination with other diagnostic imaging modalities, such as radiography, ultrasonography, and nuclear scintigraphy. However, further studies are needed to evaluate the usefulness of infrared thermographic imaging for diagnosing equine back pain.\textsuperscript{31}

**Pressure Algometry and Kinematics**

One of the diagnostic challenges with sacroiliac problems is finding an objective way to quantify pain and altered motion that may be associated with the problems. Pressure algometry and kinematics may be able to help with this. Studies have examined these modalities for measuring pain associated with back problems and sacroiliac dysfunction.\textsuperscript{32–34} The modalities were found to be useful, but they require further development and are not widely available.\textsuperscript{32–34}

**Treatment**

Because the clinical signs and the degree of pathology vary in patients with sacroiliac pain, there is no standard treatment protocol. Also, well-designed studies and controlled trials on treatment protocols and outcome of sacroiliac pain are hard to find in the literature. Treatment should be based on clinical signs or the source of pain.

**Osteoarthritis**

As with any diagnosis of osteoarthritis, the goal is to reduce pain and inflammation. The systemic use of NSAIDs has been beneficial.\textsuperscript{2,35,36} Phenylbutazone is often given to decrease the inflammatory reaction; however, other NSAIDs (e.g., flunixin meglumine, ketoprofen, naproxen, firocoxib) can also be given. As the patient becomes more comfortable and willing to perform work over time, the NSAID dose can be tapered down. Therapeutic periartricular injection of the sacroiliac region can be performed alone or in combination with systemic treatment. Corticosteroids and sarapin have been injected, alone or in combination. Improvement is usually seen in 7 to 10 days, and a second injection might be necessary in some cases. Additional supplements (e.g., glucosamine, chondroitin sulfate, polysulfated glycosaminoglycan [Adequan, Luitpold], intravenous sodium hyaluronate [Legend, Bayer], methylsulfonylmethane) may also help reduce inflammation and clinical signs of osteoarthritis.\textsuperscript{35,36}

Extended stall rest may contribute to stiffness and dysfunction of the sacroiliac joint; therefore, to maintain back and pelvic flexibility, equine patients should be worked without a rider for several weeks by hand or on a lunge and gradually reintroduced to being ridden at a walk and trot.\textsuperscript{2,36}

**Desmitis**

The use of antiinflammatory medications and supplements is indicated for acute and chronic problems.\textsuperscript{35,36} Local injection of sclerosing/irritating agents has been suggested; however, the literature does not support this proposed treatment for back and sacroiliac joint injuries.\textsuperscript{7} For acute injuries, such as when a horse flips over, complete box-stall rest for at least 45 days may be indicated to assist healing of ligamentous injury. However, in other cases, extended rest is not indicated because loss of muscle mass may exacerbate the existing problem\textsuperscript{36}; instead, affected horses should be gradually introduced to some form of work. It has been recommended that even in the first month of recovery, horses should be hand-walked for 5 minutes twice a day for up to 5 days a week.\textsuperscript{36} Eventually, turnout for short durations in a small paddock can be allowed. It may take 8 to 10 months for horses to return to regular training and performance.\textsuperscript{36}

**Nontraditional Therapies**

Nontraditional therapies such as acupuncture and chiropractic treatments have been reported, but there is little research regarding their efficacy.\textsuperscript{2,36} The main benefit of acupuncture may be pain relief, but no studies have specifically examined whether this treatment is beneficial for the sacroiliac joint.\textsuperscript{36–38} Chiropractic care can help manage muscular, articular, and neurologic components of some musculoskeletal injuries. Chiropractic care is usually
contraindicated in acute stages of soft tissue injuries, but as healing occurs, it may help restore normal joint motion. There may be a synergistic effect of using both chiropractic and acupuncture treatments.

**Other Treatments**

Physical therapy involving electrical current, application of heat or cold, mechanical vibration, or electromagnetic modalities has been used to control pain associated with sacroiliac joint problems. A change in tone in the back/gluteal muscles or joint motion restriction, which may indicate sacroiliac problems, may benefit from physical therapy.

In one study, tiludronate was given to horses with signs of pain due to osteoarticular lesions in the thoracolumbar spine. Horses that received one tiludronate treatment showed improved pain due to osteoarticular lesions in the thoracolumbar spine. Further studies are needed to evaluate the efficacy of tiludronate for treating sacroiliac joint problems.

**Conclusion**

Information on the long-term follow-up of horses with sacroiliac region pain is limited in the literature. Some horses may not return to their previous level of exercise, while others may have recurring slow-grade lameness that prevents normal athletic activity. Treatment of sacroiliac pain associated with proximal suspensory desmitis in the hindlimb can be successful. The prognosis for sacroiliac joint problems depends on the severity of the original injury to the sacroiliac region.

Diagnosis of sacroiliac injury, which is based on localizing the source of pain and providing the best treatment options, can be challenging. Further studies are needed to determine the efficacy and long-term outcomes of specific treatment and rehabilitation options.

**References**

1. Which statement best describes the forces on, and function of, the sacroiliac joint?
   a. The sacroiliac joint is very flexible and allows weight to be transferred from the vertebral column to the pelvic limbs.
   b. The sacroiliac joint is very limited in its flexion and extension but allows a rider’s weight to be transferred to the pelvic limbs.
   c. The sacroiliac joint is very limited in its flexion and extension but allows propulsive forces to be transferred from the pelvic limbs to the vertebral column.
   d. The sacroiliac joint is very limited in its flexion and extension but allows weight to be transferred from the pelvic limbs to the vertebral column only during strenuous activities such as jumping, pivoting, or racing.

2. Which of the following structures does not run through the greater sciatic foramen of the pelvis?
   a. the cranial gluteal artery
   b. the cranial gluteal vein
   c. the sciatic nerve
   d. the caudal gluteal nerve

3. The most prevalent pathologic finding in the sacroiliac joint is
   a. osteoarthritis.
   b. fracture.
   c. subluxation.
   d. sprain.

4. Clinical signs of sacroiliac pain may include
   a. severe lameness.
   b. lack of forward impulsion.
   c. a poorly muscled back.
   d. all of the above

5. Asymmetry of the tubera sacrale could be due to
   a. underdevelopment of muscle masses.
   b. fracture of the ilial wing.
   c. subluxation of the sacroiliac joint.
   d. all of the above

6. Which of the following horses is most likely to be diagnosed with a sacroiliac joint problem?
   a. an 11-year-old Warmblood used for dressage
   b. a 2-year-old Arabian shown in halter classes
   c. a 20-year-old Quarter horse used for trail rides
   d. a 7-year-old Saddlebred show horse

7. Which statement regarding radiography of the sacroiliac joint is false?
   a. Radiography of the pelvis is difficult, requiring experienced personnel and appropriate radiography equipment.
   b. Intestines may be superimposed on the joint space, limiting interpretation of radiographs.
   c. Radiography is the best diagnostic tool because the sacroiliac joint is similar in all horses, so pathology is easily seen.
   d. Radiography is an important diagnostic tool but should be used in combination with other diagnostic and clinical findings.

8. When a nuclear scintigraphy scan of the sacroiliac joint is compared with a scan from a normal horse, the horses should be of similar
   a. height.
   b. age.
   c. weight.
   d. breed.

9. Ultrasonography of the sacroiliac joint is useful for evaluating
   a. bony structures.
   b. ligaments.
   c. the joint space.
   d. all of the above

10. Treatment of suspected sacroiliac joint disease does not include
    a. administering systemic NSAIDs.
    b. continuation of regular exercise with a rider to maintain back and pelvic flexibility.
    c. injection of corticosteroids in the periarticular sacroiliac joint.
    d. physical therapy to control pain in the sacroiliac region.