

How to Inject the Sacroiliac Joint Region in Horses

Emmanuel Engeli, MedVet; Kevin K. Haussler, DVM, DC, PhD;
Hollis N. Erb, DVM, MS, PhD

A safe, consistent, and well-tolerated periarticular sacroiliac joint injection technique was developed in horses. Local bony landmarks are readily identifiable, and the injection is easy to perform. This procedure provides equine practitioners with a combined diagnostic (sacroiliac joint anesthesia) and therapeutic tool for the management of sacroiliac joint osteoarthritis in horses. Authors' addresses: Department of Clinical Sciences (Engeli), Department of Biomedical Sciences (Haussler), and Department of Population Medicine and Diagnostic Sciences (Erb), College of Veterinary Medicine, Cornell University, Ithaca, NY 14853. © 2002 AAEP.

1. Introduction

Sacroiliac joint osteoarthritis has been recognized as a significant cause of poor performance in horses. Up to 8% of Standardbreds in training¹ and 15% of competition horses, especially hunters, jumpers, and eventing horses, are reported to be clinically affected by osteoarthritis of the sacroiliac joint.² Clinical signs of sacroiliac osteoarthritis are often non-specific and may include poor performance, refusal of jumps, lack of hind limb impulsion, poor croup musculing, back soreness, resistance to trot or pace at high speeds in Standardbred racehorses, and a low-grade or shifting hind limb lameness.²⁻⁴

Current diagnostic imaging modalities, such as ultrasonography, radiography, and nuclear scintigraphy, are not highly specific or sensitive for diagnosing sacroiliac joint osteoarthritis.⁵⁻⁷ The diagnosis of sacroiliac osteoarthritis is typically based on exclusion of other possible causes of poor performance and hind limb lameness. The primary diagnostic tools used by practitioners for lower limb

lameness evaluation are perineural and intra-articular joint injections with local anesthetics. Unfortunately, the deep and seemingly inaccessible location of the sacroiliac joint in horses has limited the clinical application of intra-articular or periarticular injections to this location. Several authors suggest injection of medications adjacent to the sacroiliac region; however, inappropriate needle placement or the use of needles that are too short may limit the effectiveness of the injected medication.⁸⁻¹⁰

In humans, periarticular injection of the sacroiliac joint has been reported for the diagnosis and medical management of sacroiliac joint osteoarthritis.¹¹ Specific placement of regional anesthesia near the equine sacroiliac joint region could substantially improve the diagnostic capabilities for horses affected with sacroiliac osteoarthritis. In horses, degenerative changes associated with sacroiliac osteoarthritis occur primarily at the caudomedial aspect of the sacroiliac joint.^{12,13} It was hypothesized that a safe and consistent periarticular injection technique

NOTES

HOW-TO SESSION

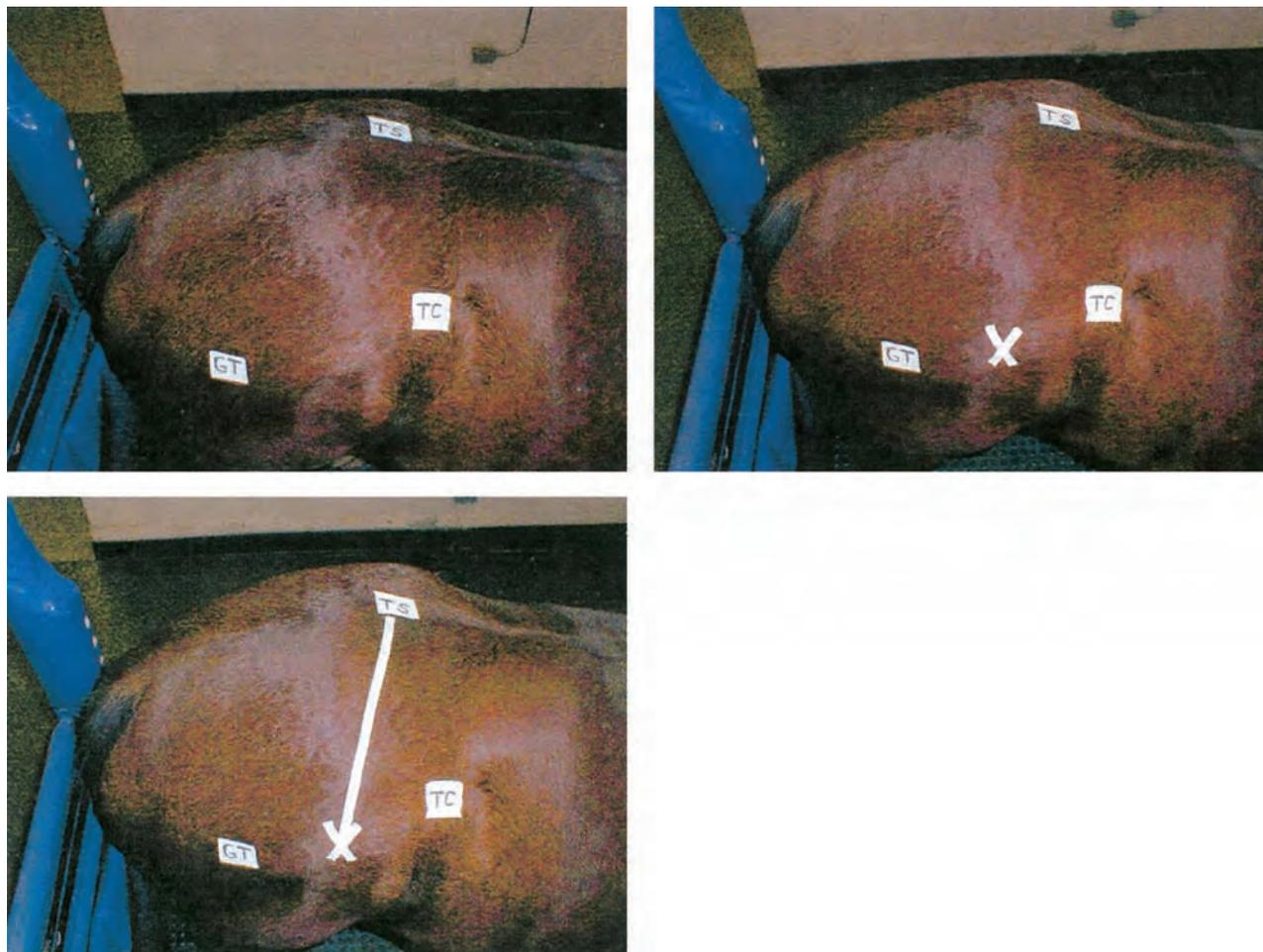


Fig. 1. External bony landmarks for entry site of the needle and needle advancement. Entry site of the needle is 2-cm cranial to the cranial aspect of the contralateral tuber sacrale (TS). The midpoint distance (X) of the line between the cranial aspect of the ipsilateral tuber coxae (TC) and the cranial aspect of the greater trochanter of the femur is used as target for needle advancement (white line)

could be produced to place medication adjacent to the caudomedial sacroiliac joint margin. The purpose of this study was to develop a reliable diagnostic and therapeutic tool for the management of sacroiliac joint disorders in horses.

2. Materials and Methods

Twenty-four horses were used to develop and assess a diagnostic injection protocol for the sacroiliac joint in horses. Horses were studied under animal use protocols approved by the Center for Research Animal Resources (CRAR) and the Institutional Animal Care and Use Committee (IACUC) at Cornell University. The horses had no current history of upper hind limb lameness and were euthanized for reasons unrelated to the sacroiliac or pelvic regions. The study sample consisted of 11 mares, 12 geldings, and 1 stallion, ranging in age from 8 mo to 30 yr (median age, 11 yr). Breeds represented included 12 Thoroughbreds, 1 Thoroughbred-Warmblood cross, 5 Quarter Horses, 2 Quarter Horse crosses, 1 Paint, 1

Standardbred, 1 Warmblood, and 1 Arabian cross. Body weight ranged from 273 to 636 kg (median weight, 506 kg).

Part I: Cadaveric Study

Six sacropelvic specimens were used to review the clinically relevant anatomy of the sacroiliac joint region and to evaluate a viable injection protocol in post-mortem specimens. After consideration of relevant anatomical features, a craniomedial approach to the sacroiliac joint was selected (Fig. 1). A 3-mm stab incision was made in the skin 2-cm cranial to the contralateral tuber sacrale using a No. 15 scalpel blade^a to reduce skin resistance during needle insertion and advancement. A 25-cm, 15-gauge spinal needle (b) was bent (Fig. 2). The curve helps keep the needle as close as possible to the iliac wing during needle advancement. The needle was inserted and advanced along the medial aspect of the ipsilateral iliac wing until the dorsal surface of the sacrum was encountered (Fig. 3). One milliliter of



Fig. 2. Custom made 25-cm (10-in.), 15-gauge spinal needle with stylette.^b The middle of the needle is bent in the direction of the bevel at a 25° angle, measured from the unbent needle.

methylene blue^c was injected bilaterally periarticularly in the sacroiliac joint region. The location and distance of methylene blue stained tissues relative to the sacroiliac joint margins was recorded after dissection and disarticulation of the sacroiliac joint.

Part II: In Vivo Study

Eighteen horses were used in the ante-mortem portion of the study to validate the in vivo application of the sacroiliac joint injection technique. The horses were restrained in stocks and sedated with a mixture of detomidine hydrochloride^d (0.01 mg/kg, IV) and butorphanol tartrate^e (0.01 mg/kg, IV). The entry site of the spinal needle was infiltrated subcutaneously with 2 ml 2% lidocaine hydrochloride.^f Bilateral injections of 1 ml methylene blue were performed adjacent to the sacroiliac joint. The horses were euthanized 20 min post-injection. Subsequent dissection and sacroiliac joint disarticulation was performed. The location and distance of methylene blue stained tissues relative to the sacroiliac joint margins was recorded after dissection and disarticulation of the sacroiliac joint.

Data Analysis

The location and distance of the methylene blue-stained tissues relative to the sacroiliac joint margins was recorded. Location of the dye ≤ 2 cm from the sacroiliac joint margin was considered a successful injection. Because of the possibility that medication would not reach the sacroiliac joint or penetrate the joint capsule if placed too far from the joint, dye locations >2 cm from the sacroiliac joint were considered to be unsuccessful. The medial sacroiliac joint margin was divided into cranial, middle, and caudal thirds for a more specific assessment of the methylene blue locations. (Fig. 2). Osteoarthritic changes in the sacroiliac joint are consistently found in the caudomedial joint aspect in

affected horses. Dye location in the middle or caudal third of the medial joint margin or dye identified at the caudal joint margin was therefore considered a successful injection. Dye at the cranial third of the medial joint margin or at the cranial joint margin was considered unsuccessful.

The age distribution was slightly skewed; therefore, age associations were analyzed using non-parametric statistical methods. Because of small cell numbers, breed comparisons were collapsed into Thoroughbred (including Thoroughbred cross) versus other breeds, and gender comparisons were collapsed into female versus male for statistical evaluation. Associations among continuous variables were tested with Spearman's rank correlation. Associations among dichotomous variables were tested with Fisher's exact test. All statistical tests were two-sided, and significance was interpreted at $p \leq 0.05$.

3. Results

The in vivo sacroiliac joint injections were well tolerated in all horses. Intra-articular location of methylene blue of the sacroiliac joint was not noted in any of the 48 injected sacroiliac joint regions. Damage to the neurovascular structures passing through the greater sciatic foramen was not noted in any specimen secondary to needle placement. The specific locations of the dye relative to the medial sacroiliac joint margin (87%) were identified in the cranial third (4%), in the middle third (31%), and in the caudal third (52%). Thirteen percent of all methylene blue locations were found at the caudal sacroiliac joint margin. Ninety-six percent (46 joints) of the dye locations met the success criteria of being situated in the middle or caudal thirds of the

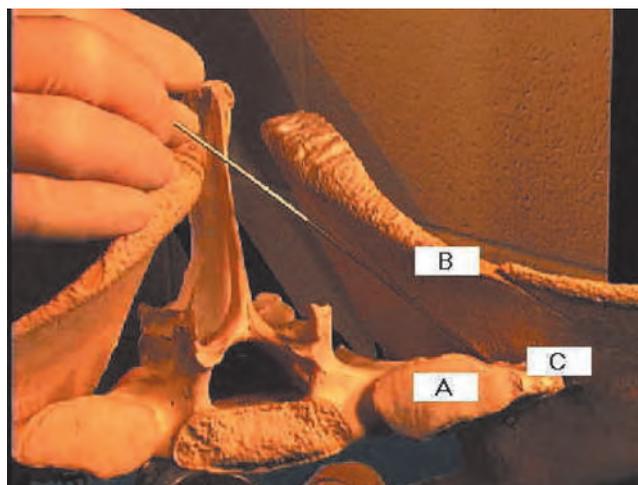


Fig. 3. Sacroiliac region from cranial with a needle placed adjacent to the sacroiliac joint. The 15-gauge, 25-cm-long spinal needle^b is advanced towards the dorsal sacrum (A) and along the ilial wing (B) to place medication adjacent to the medial sacroiliac joint margin (C).

HOW-TO SESSION

medial joint margin or at the caudal joint margin. Eighty-eight percent (42 joints) of the methylene blue locations fulfilled the success criteria of being located ≤ 2 cm from the sacroiliac joint margin. The methylene blue was located 1.2 ± 0.8 cm (mean \pm SD; range, 0.2–3.8 cm) from the sacroiliac joint margins. The overall success rate considering both location and distance of the methylene blue-stained tissue relative to sacroiliac joint margins was 83% (40 joints).

Age, weight, breed, and sex were not related to successful methylene blue location or distance relative to the sacroiliac joint margin. There were no significant differences in the location or the distance of the dye placement relative to the sacroiliac joint margins in the 6 post-mortem versus 18 in vivo horses. All unsuccessful dye locations (i.e. cranial third of the medial joint margin) were identified on the right side of horses in the post-mortem group.

4. Discussion

In the past, the diagnosis of sacroiliac osteoarthritis and sacroiliac desmitis was frustrating and based on exclusion of other possible causes of hind limb lameness. An injection technique of the sacroiliac joint region similar to that recently used in humans would be an ideal diagnostic and therapeutic tool. The deep location and the thick overlying croup musculature have been identified as major difficulties for accessing this anatomic region.¹⁴ The passage of the sciatic nerve, cranial gluteal nerve, artery, and vein through the greater sciatic foramen, just caudal to the sacroiliac joint, is an additional hazard for injections in this anatomic region. A protocol for injection of the dorsal sacroiliac ligament at its location adjacent to the tuber sacrale has been described, but direct access to the sacroiliac joint, which is located significantly deeper, has not been reported.^{8–10}

Periarticular methylene blue was identified in close proximity to the caudomedial sacroiliac joint region in the majority (96%) of the injected specimens. Eighty-eight percent of the methylene blue locations were identified ≤ 2 cm from the sacroiliac joint margins. The 83% overall success rate (i.e., injection sites fulfilling both the location and the distance criteria) demonstrates the reliability of this procedure. The close proximity of the methylene blue to the sacroiliac joint margins and reported clinical effectiveness of periarticular sacroiliac joint injections in humans suggest that the described injection technique can be employed in horses to provide diagnostic anesthesia to the sacroiliac joint region.¹¹ In a pilot study, three of four horses with presumed sacroiliac pain were injected using the described technique with 10 ml of mepivacaine⁵ and had a positive response (i.e., were less lame and had decreased caudal back soreness).

The described periarticular sacroiliac joint injection technique is a safe, consistent, and well-tolerated procedure. Local bony landmarks are readily identifiable, and the injection is easy to perform. This injection technique has the potential to be used by equine practitioners as a combined diagnostic (sacroiliac joint anesthesia) and therapeutic tool for the management of sacroiliac joint osteoarthritis in horses.

This study was funded by the Dean's Fund for Clinical Excellence, College of Veterinary Medicine, Cornell University, Ithaca, New York.

References and Footnotes

1. Dalin G, Magnusson L-E, Thafvelin BC. Retrospective study of hindquarter asymmetry in Standardbred trotters and its correlation with performance. *Equine Vet J* 1985;17:292–296.
2. Jeffcott LB. Disorders of the thoracolumbar spine of the horse—a survey of 443 cases. *Equine Vet J* 1980;12:197–210.
3. Rooney JR. Sacroiliac arthrosis and “stifle lameness.” *Mod Vet Pract* 1977;58:138–139.
4. Jeffcott LB, Dalin G, Ekman S, et al. Sacroiliac lesions as a cause of chronic poor performance in competitive horses. *Equine Vet J* 1985;17:111–118.
5. Dyson SJ. Sacroiliac pain: is definitive diagnosis possible?, in *Proceedings. 7th Cong Equine Med Surg* 2001;84–92.
6. Jeffcott LB. Pelvic lameness in the horse. *Equine Pract* 1982;4:21–47.
7. Tomlinson JE, Sage AM, Turner TA, et al. Detailed ultrasonographic mapping of the pelvis in clinically normal horses and ponies. *Am J Vet Res* 2001;62:1768–1775.
8. Hardy J, Marcoux M. L'Athrose sacro-iliac chez le cheval Standardbred. *Med Vet Quebec* 1985;15:185–189.
9. Marks D. Back pain. In: Robinson ME, ed. *Current therapy in equine medicine 4*. Philadelphia: W.B. Saunders Co., 1997;6–12.
10. Snyder JR. Selected intra-articular injections in the horse, in *Proceedings. 7th Cong Equine Med Surg* 2001;115–123.
11. Luukkainen R, Nissila M, Asikainen E, et al. Periarticular corticosteroid treatment of the sacroiliac joint in patients with seronegative spondylarthropathy. *Clin Exp Rheumatol* 1999;17:88–90.
12. Dalin G, Jeffcott LB. Sacroiliac joint of the horse. 1. Gross morphology. *Anat Histol Embryol* 1986;15:80–94.
13. Haussler KK, Stover SM, Willits NH. Pathology of the lumbosacral spine and pelvis in Thoroughbred racehorses. *Am J Vet Res* 1999;60:143–153.
14. Rooney JR. The horse's back: biomechanics of lameness. *Equine Pract* 1982;4:17–27.

^aRib-Back Carbon Steel No. 15 surgical blade, Becton Dickinson Acute Care, Franklin Lakes, NJ 07417.

^bEchotip Needle, Disposable Lancet Needle 15 gauge 25 cm (J-DSN-152501), Cook Ob/Gyn, 1100 West Morgan Street, Spencer, IN 47460.

^cMethylene Blue, Certified (Basic Blue 9), Sigma Chemical Co., P.O. Box 14508, St. Louis, MO 63178.

^dDormosedan, Pfizer Animal Health, Exton, PA 19341.

^eTorbugesic IV, Fort Dodge Animal Health, Fort Dodge, IA 50501.

^fLidocaine 2% injectable, The Butler Co., Columbus, OH 43228.

^gCarbocaine-V (2% mepivacaine hydrochloride, USP), Pharmacia & Upjohn Co., Kalamazoo, MI 49001.