



E-ROUNDS

APPLIED RESEARCH FOR TODAY'S EQUINE COMPANION

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Case File: Diagnostic Blocking

It's not always as specific as we think

Signalment and History

A 7-year-old warm blood mare competing in dressage at third level presented for a left forelimb lameness. The mare had been competing well all spring, but developed a left forelimb lameness after a show where the footing was noted to be firmer than expected.

Initial Examination, 06/01/12

On examination, the mare had a moderate amount of distal interphalangeal joint effusion (coffin joint) in the left front and a mild amount in her right front coffin joint. She also had a mild amount of effusion in the left forelimb metacarpophalangeal joint (fetlock joint). Palpation of her hind limbs demonstrated mild effusion in both femoropatellar joints and the left medial femorotibial joint (stifle joints). There was no significant sensitivity to hoof tester pressure in any of the feet.

On baseline lameness exam, the mare was sound at a walk on hard ground. In a straight line on hard ground, she had a bilateral 2/5 forelimb shifting lameness that was more pronounced in the left front, as well as a 2/5 left hind lameness. In a circle to the right on hard ground, she was 2/5 lame on the right front, 2+/5 lame left hind, and in a circle to the left, she was a 2+/5 lame on the left front and remained a 2/5 lame on the left hind. On softer footing, the forelimb lameness improved, but did not completely resolve, and the left hind lameness remained unchanged when circling both directions. Flexion exams revealed a mild response to both forelimb distal limb manipulation and a mild response to left stifle manipulation, all other flexion exams were considered negative.

Diagnostic Blocking

- Left front Palmar digital nerve block (PDN—which desensitized the majority of the structures located within the foot)—80% improvement in the left front lameness.
- Right front PDN—lameness resolved in the right front.
- Left hind low 4 point or low plantar nerve block (the fetlock joint and structures distal to it are desensitized)—no significant change to the left hind lameness.
- Left hind deep branch of the lateral plantar nerve block (used to desensitize the soft tissue structures in the proximal, plantar aspect of the metatarsus)—no significant change to the left hind lameness.
- Intra-articular analgesia of the left medial and lateral femorotibial joints and the femoropatellar joints—70% improvement in the left hind lameness.

CONTACT INFO

Colorado State University
Orthopaedic Research Center
300 West Drake Road
Fort Collins, CO 80523-1678
Phone: (970) 297-4165

[CSU Orthopaedic Research Center](#)

At Colorado State University, equine veterinary care is delivered through the collaboration of three nationally recognized equine service centers:

- Colorado State University Orthopaedic Research Center
- Colorado State University Equine Reproduction Laboratory
- Colorado State University Veterinary Teaching Hospital Equine Service

Equine treatment capabilities at CSU are at the forefront of equine veterinary medicine through the shared expertise of these organizations.

Questions regarding this case file may be directed to:

Melissa King, DVM, ACVSMR

melissa.king@colostate.edu

[Equine News & Events](#)

Imaging

- Radiographs of both front feet demonstrated an adequate palmar coffin bone angle, long toes with a break over distance of 29 mm bilaterally, less sole depth on the left front, and a mild medial to lateral imbalance on the right front.
- Left stifle radiographs—no significant changes noted.

Treatment

- Both forelimb coffin joints were injected with intra-articular triamcinolone, amikacin, and hyaluronic acid.
- The left medial femorotibial joint was also treated with intra-articular triamcinolone, amikacin, and hyaluronic acid.
- Shoeing changes were recommended that consisted of trimming the toe, moving the break over point back, fitting full through the quarters, balancing the foot medially, and shoeing with a rim pad.

Recheck Examination, 06/18/12

On examination about two weeks later, there was significantly less effusion in the forelimb coffin joints. However, the left forelimb fetlock joint effusion remained mild to moderate. On baseline lameness exam, the mare was sound at a walk on hard ground. In a straight line on hard ground, she was a 1+/5 left front lame, and in a circle to the left on hard ground, she was a 2/5 left front; in a circle to the right, she was 1+/5 lame left front. There was no left hind or right front lameness noted at this time. The left front lameness remained unchanged when asked to trot in softer footing. The left front distal limb flexion was mildly positive.

Diagnostic Blocking

- Left front PDN—no change in the lameness.
- Left front abaxial nerve block (which desensitizes the foot and pastern regions)—no change in the lameness.
- Left front low 4 point or low palmar nerve block—70% improvement in the lameness.

Radiographs

- Left forelimb fetlock joint—demonstrated mild osteoarthritis (Fig. 1).

Treatment

- The left forelimb fetlock joint was treated with intra-articular triamcinolone, amikacin, and hyaluronic acid.

Recheck Examination, 07/21/2012

The mare had been doing well following treatment of the forelimb coffin joints and left fetlock joint. The weekend of July 7, 2012, she performed extremely well at a show and was schooled hard, in slightly deep footing. During one of the warm-up sessions, the rider felt the mare take a bad step but no lameness was appreciated. The mare was rested for a few days after the show and when she was brought back to work, a marked left forelimb lameness was noted.

On exam, there was mild left forelimb fetlock joint effusion, as well as mild left forelimb coffin joint effusion. A 3/5 left forelimb lameness was noted when the mare was trotting in a straight line on hard ground. In a circle to the left and right, the lameness remained unchanged when trotting on hard ground. However, the lameness did worsen when trotting in soft ground, with the lameness being more prominent when circling left. She was negative to distal limb flexion of the left forelimb.



Fig. 1: Lateral radiograph of the left front fetlock. The red circle demonstrates a smoothly margined, periarticular osteophyte along the dorsal aspect of the proximal first phalanx.

Diagnostic blocking

- Left front PDN—resolved the left front lameness

Plan

- Considering the history, onset of the lameness, and blocking pattern, a soft tissue injury within the left front foot was considered the most likely differential.
- Due to the limited ability to image soft tissue structures through the hoof, an MRI was recommended.

Recheck Examination, 08/16/2012

The mare presented to the CSU Veterinary Teaching Hospital for a diagnostic MRI. On presentation, she was still 3/5 lame on the left front and a PDN nerve block was repeated to confirm the location of the lameness and determine the region to be assessed during the MRI. The lameness again significantly improved (70–80%) following the PDN block, which again is typically thought to desensitize the region of the foot.

MRI findings

- Minimal findings in the foot led to MRI of more proximal structures.
- Fetlock region
 - Multifocal subchondral bone defects were present in the distal aspect of the third metacarpal bone and the proximal aspect of the first phalanx (Fig. 2). The majority of defects are located on the medial condyle of the third metacarpal bone at the level of the parasagittal groove and medial aspect of the proximal first phalanx.
 - Moderate pathologic change of the subchondral bone, including osseous sclerosis, mild increased bone edema of the distal third metacarpal and proximal first phalanx, as well as loss of trabecular bone in the distal third metacarpal bone.
 - Multifocal full thickness cartilage defects affecting both the proximal first phalanx and the distal aspect of the third metacarpal bone.
 - Moderate fetlock joint capsulitis.

Plan

- Arthroscopy of the left forelimb fetlock joint was recommend based on the MRI findings.
 - The defects within the cartilage and subchondral bone were identified and debrided. Devitalized bone was evident below the cartilage defects and curettage was performed to expose healthy bone.

Treatment plan

- Bone marrow was harvested from the tuber coxae for stem cell culture.
- The left front fetlock joint was treated with stem cell injections intra-articularly four weeks after surgery.
- The mare is currently in the early phases of her rehab therapy and is doing well.

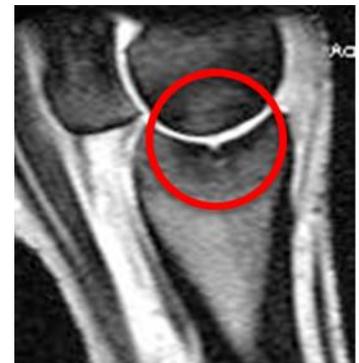


Fig. 2: Sagittal plane MRI image of the left front fetlock. The red circle demonstrates a subchondral bone and articular cartilage defect in the proximal aspect of the first phalanx.

Discussion Points

Regional or perineural analgesia is a critical part of every lameness exam. Diagnostic blocks are used to determine a more specific location of pain resulting in the lameness. However, on occasion, the pieces of the puzzle do not fall easily into place and the local analgesic results are not specific and can be confusing. The improvement in the lameness following local analgesia often dictates subsequent imaging and treatments.

The palmar digital nerve block is one of the most commonly performed diagnostic approaches during a lameness exam. It (Fig. 3) typically desensitizes the entire sole of the foot, the navicular apparatus, soft tissue structures in the heel region, the coffin joint, and a portion of the deep digital flexor tendon within the hoof. The pastern joint can also be desensitized, depending on the volume of anesthetic solution injected and the location of the needle. Based on the likelihood of

desensitizing structures above the intended region of concern, the PDN block is conducted as far distally as possible (the needle is placed over the palmar digital nerve at the level of the collateral cartilage of the foot) and directed distally or towards the hoof.

Another precaution to avoid inadvertent analgesia of structures located above the region of interest is to utilize of low volume of anesthetic solution; for the PDN block, typically no more than 1.5 ml of local anesthetic solution is deposited over



Fig. 3: Demonstrates needle placement for a palmar digital nerve block.



Fig. 4: Demonstrates the proximal diffusion of contrast material after a low 4-point nerve block. The red arrow demonstrates the level of needle placement for the injection. The white arrows demonstrate the movement of the contrast material proximal to the injection site. This figure demonstrates the potential diffusion pattern of

each palmar digital nerve. Following the deposition of anesthetic solution, the horse's lameness should be evaluated within 5 minutes, as the local anesthetic solution can diffuse rapidly and desensitize unintended structures, which may result in misinterpretation of the source of the lameness. Several research studies using contrast material have demonstrated significant proximal diffusion within 10 minutes, leading to a decrease in the specificity of nerve blocks (Fig. 4). The anesthetic solution is believed to travel proximally along the neurovascular bundle or diffuse via the lymphatics, which is more likely to occur when larger volumes of anesthetic are injected.

Take Home Message

Lameness diagnosis is both an art and a science, with diagnostic analgesia remaining a crucial part of every lameness exam. However, proximal diffusion of anesthetic solution should be considered a possibility when diagnostic imaging and therapeutic approaches do not result in resolution of the lameness. To increase specificity, inject small volumes of anesthetic solution and evaluate the lameness in less than 10 minutes. However, as this case demonstrates, even injection of small volumes and prompt evaluation of nerve blocks can be misleading. This case also demonstrates the benefit of "real time" MRI image interpretation, as the fetlock lesions would have been missed if the MRI images had been evaluated following the completion of the study.

Equine News & Events

- **Saturday, March 9–Sunday, March 10**

Second Annual Equine Symposium

Students need your support—sign up now to attend the [Second Annual Equine Symposium](#) sponsored by The Colorado State University Student Chapter of the AAEP. This two-day set of lectures, including case discussions and an optional wet lab, provides an educational opportunity for both the seasoned equine veterinarian and soon-to-be veterinarians.

- **Tuesday, April 2 and Saturday, April 27**

Join us for a **free** screening of the new CSU film documentary, “Horse Sense.” This film was created by Chapman University’s documentary film program and illustrates how CSU is helping advance equine health, support equine industry growth, and preserve the human-horse connection. Two dates are available in Fort Collins:

- Tuesday, April 2 at 7:00 p.m. at the Lory Student Center Theatre on the CSU Campus. Click [here](#) to register.
- Saturday, April 27 at Noon during the Legends of Ranching Sale at the B.W. Pickett Equine Center. Click [here](#) to register.

- **Friday, April 5**

Seminar

“What Is Equine Sports Medicine and What Role Does It Play in the Life of the Equine Athlete?”

This seminar is part of the VTH Open House and will be held at **the Diagnostic Medicine Center, Room 101 starting at 7 p.m.**

The seminar is presented by Dr. Melissa King, lead clinician for the [Equine Sports Medicine Service](#). Please call Katie Briggs if you have questions at 970-297-4266.

- **April 26**

Equine Reproduction Laboratory Grand Opening

The [Equine Reproduction Laboratory](#) invites you to the grand opening of its research, teaching, and clinical service flagship facility. The event begins at 4 p.m., with short remarks at 4:15 p.m. The grand opening features guided tours (until 5:15 p.m.) and refreshments. No reservations needed, just drop by and enjoy the hospitality of the new ERL.

- **April 27**

Legends of Ranching and Special Showing of “Horse Sense”

The annual [Legends of Ranching Performance Horse Sale](#) caps a trademark education program in CSU Equine Sciences. In the program, CSU students have the unique opportunity to train well-bred young horses, taking the animals from barely halter-broken to working calmly under saddle. Legends of Ranching is held at the B.W. Pickett Equine Center, on Colorado State University’s Foothills Campus. The event will feature a special showing of the documentary Horse Sense at noon, with introduction by Dr. Jerry Black, Director of the Equine Sciences Program and the Equine Reproduction Laboratory.