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EQUINE VETERINARIAN™

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FALL 2012

ILLUMINATING THE SCIENCE & ART OF PRACTICE

MRI of the Equine Stifle

FOCUS ON THE VETERINARY TEAM:
Caring for the Geriatric Horse

Anatomy of an Exam Room



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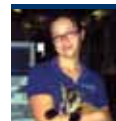


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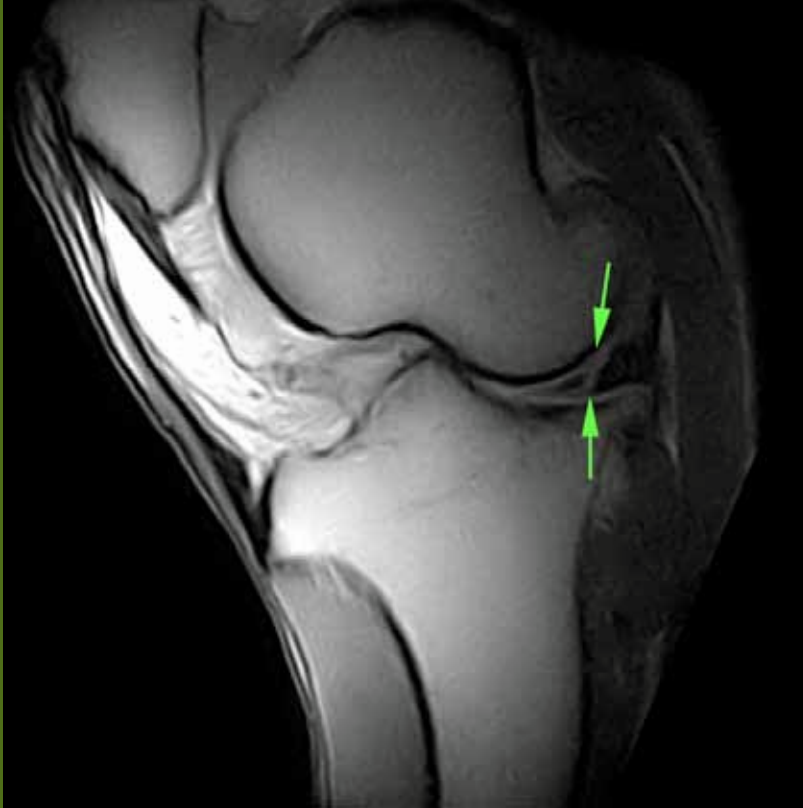
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Magnetic Resonance Imaging of the Equine Stifle: 61 Clinical Cases

Since 2008, low-field magnetic resonance imaging (MRI) of the stifle has been performed on live horses at multiple veterinary institutions. This article discusses this new technique and summarizes MRI findings in 61 horses compiled from five equine veterinary practices.



...:Alexia L. McKnight,
DVM, DACVR

Dr. McKnight is a radiologist specializing in magnetic resonance image interpretation for veterinary institutions in the United States and around the world. Her consulting practice, McKnight Insight, LLC, is located in Chadds Ford, Pennsylvania.

Despite routine use and growing popularity of MRI in equine medicine, the stifle remains a very difficult joint to examine via most available imaging modalities. Although MRI of the stifle has been reported in live horses using an ultra-short, wide-bore 1.5 T magnet system, clinical cases are not typically performed with this unit due to the difficulty of patient positioning and size limitations of most performance horses.^{1,2} Over the past few years, however, there have been efforts by a group of practitioners at five different practice sites, each owning a low-field MRI system (Rotating Vet MR Grande XL, Esaote, SpA, Genova, Italy) to

image the stifle in live performance horses (Figure 1). This report summarizes these efforts and reviews common clinical findings in 64 stifle examinations from 61 horses.

MATERIALS AND METHODS

There are currently five institutions (four in the United States and one in Europe) that use the Esaote 0.25T Rotating Vet MR Grande XL MRI system to scan equine stifles of clinical cases. To perform a stifle MRI examination, the magnet must be rotated 90 degrees so that the bore is oriented vertically. All horses are scanned under general anesthesia in dorsal or lateral recumbency, with the hind limb of interest extended vertically so that the femorotibial joint is centered (or close) to the magnet isocenter. A flex coil is then wrapped around the dorsal aspect of the stifle (Figure 2). For most horses, MRI protocol includes PD- and T2-weighted sequences, short tau inversion recovery sequence (STIR), and an isotropic 3D gradient echo (GE) T1 sequence. Total acquisition time in the scanner is currently about 50 to 65 minutes. Together, the PD- and T2-weighted sequences (4 to 5 millimeters [mm] thick) are useful for assessing tendons and ligaments and evaluating the quality of collagen matrix in acute, chronic, and healed injuries. The STIR sequences (e.g., 4 to 5 mm) are highly beneficial for assessing bone lesions, while the 3D GE T1 sequence is very thin (e.g., 0.7 to 1.2 mm) and useful to assess articular, subchondral, and other fine bony detail.

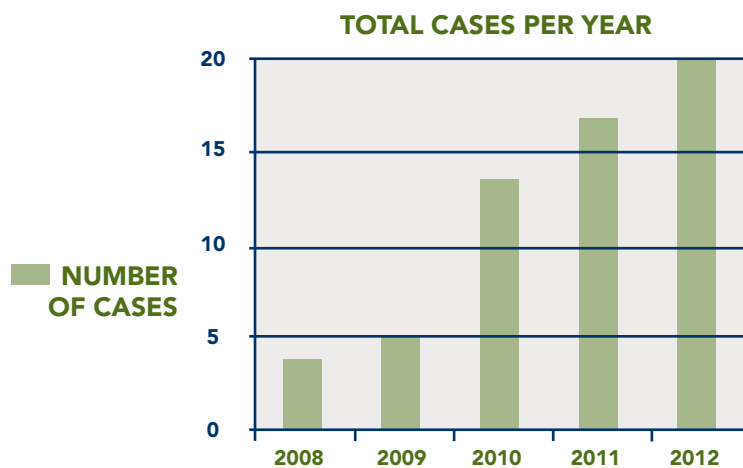


Figure 1. This figure illustrates the total number of equine stifle magnetic resonance imaging studies from all five participant veterinary institutions between 2008 to 2012.

Patient Selection

The horses in this retrospective case series are from each of the five practice sites that requested written interpretations from the author (15, 10, 13, 11, and 12 written stifle MRI interpretations, respectively, from each of the five practices). Beginning in the spring of 2008 to the writing of this article, MRI of the stifle was performed in a total of 61 clinical cases. The ages of the horses ranged between 2 and 19 years. The breeds included Quarter Horse (23), Warmblood (19), Thoroughbred (4), Standardbred (2), Saddlebred (2), Morgan (2), Friesian (1), and Tennessee Walking Horse (1); in seven of the cases, the breed was unspecified. There were 17 geldings and 10 mares; the rest of the cases were unspecified. The disciplines of each patient varied and were not always included in the patient history; however, the predominant disciplines among those cited were racing, dressage, jumping, eventing, Western pleasure, barrel racing, and cutting. The main reason given for the MRI request

was acute or chronic lameness isolated to one (or both) stifles. One examination was requested by an owner for a horse without clinically identifiable stifle lameness. The MRI examinations were unilateral, with the exception of three bilateral studies. All patients were scanned live and recovered from general anesthesia, with the exception of one horse, whose clinical prognosis was poor and was euthanized on the table; therefore, this patient's MRI study was completed postmortem.

The current average number of stifle MRI cases per year among the five practice sites is about seven, ranging from 3 to 15 horses per year. Figure 1 illustrates the current total number of increasing cases per year for all five sites.

Proper case selection, preparation, and positioning are critical to safely perform a stifle MRI study. In addition to the cases reported in this study, MRI also was attempted on several particularly short-legged horses and ponies, but positioning attempts were aborted



Photo courtesy of Equine MRI of Palm Beach

Figure 2. Typical example of a horse undergoing magnetic resonance imaging of the stifle, positioned in lateral recumbency with a slight tilt toward dorsal recumbency.

Anatomy of an Examination Room

A physical examination on a horse can be performed just about anywhere—in the whipping wind, on a muddy racetrack, in the aisle of a barn. However, if you are going to the trouble of designing your own hospital, taking some time to think through your decisions will ultimately make your job more rewarding. In this month’s issue, we begin a dialogue focusing on the importance of well-designed work spaces by dissecting one of the simplest and most important rooms: the examination room.



...Heather E. Lewis, AIA, NCARB

Heather E. Lewis is a principal at Animal Arts in Boulder, Colorado; her area of expertise is in equine and large animal veterinary hospital and animal shelter design. Ms Lewis is a member of the American Institute of Architects and is certified by the National Council of Architectural Registration Boards.

PROGRAMMING

To define your own requirements, begin by asking yourself the following questions:

- How will I use my examination room?
- Will it double as a treatment area?
- Will I need multiple specialized rooms?

The answers to these questions will depend on both the size and style of your practice. This process of asking and answering many questions, from general to specific, is referred to as “programming.” Whether you do the programming yourself or with your architect, you should end up with the following answers:

- The use of the examination room, generally and specifically
- The relationship of the examination room to other interior and exterior spaces
- The specific physical, material, and equipment requirements of the examination room

Model of an Examination Room

To illustrate how a solid program translates into a thoughtful design, we will take you through an examination room based on one of our current client’s programs (Figure 1). The key notes in this architectural model tie to discussions that we have shared with this client. As we walk you through this specific design model, we will illustrate some basic principles and rules of thumb you should follow. By the end of this article, we hope to inspire you to create your own signature workspace!

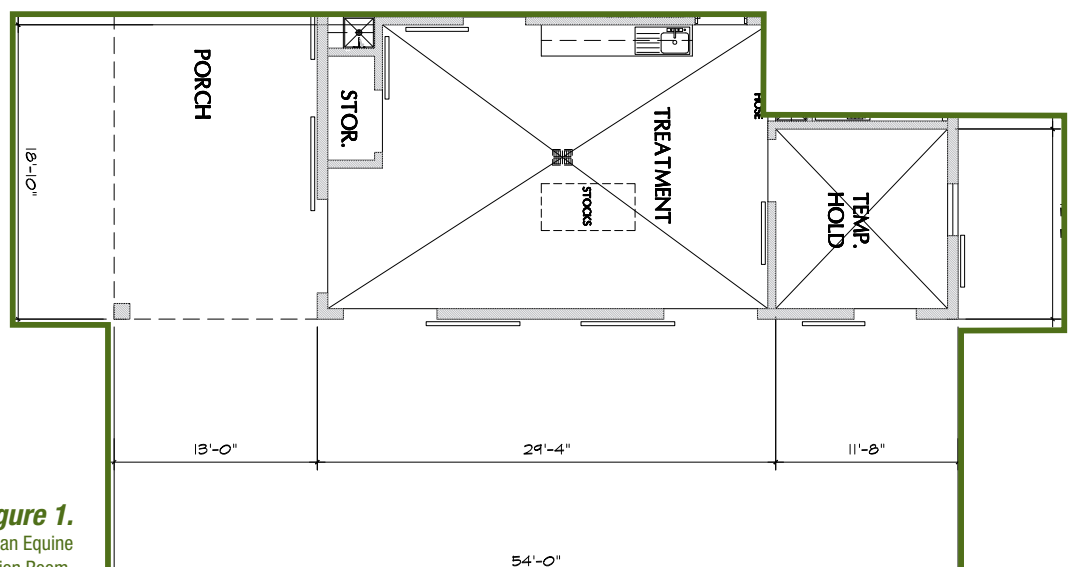


Figure 1.
Architectural Model of an Equine Hospital's Examination Room.

Caring for the Geriatric Horse

One of the most rewarding aspects of veterinary practice is caring for the same clients and horses through the years. Perhaps you have worked at a practice long enough to have seen a client's prized foal or yearling become his or her favorite riding horse. Now this same horse is entering his "golden" years and has become a pasture pet. What can you, as a veterinary technician and integral part of the veterinary team, do to help ensure geriatric patients receive optimal care during their later years?

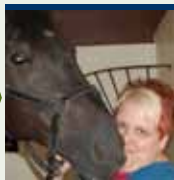
Geriatric horses (i.e., 20 years of age or older) require special care, including regular veterinary examinations, foot trimming, adequate nutrition, and management to ensure their senior years are optimal. In the following sections, we examine a few common problems seen in geriatric horses and highlight some of the important areas to assess when evaluating both these patients and their environment.

VETERINARY EXAMINATION AND COMMON DISEASES

The general physical examination of a geriatric horse follows the same guidelines as an examination performed on a younger horse. It is important to evaluate the horse's vaccine schedule periodically and perform regular fecal egg counts and tapeworm antibody titers to ensure an appropriate selection of dewormers and gauge efficacy of treatment. In addition, older horses are more prone to certain health conditions such as those conditions highlighted below including poor body condition; endocrine, ocular, dental, and orthopedic disorders; and nutritional deficiencies. (Cardiovascular disease and other disorders will be covered in a future article).

BODY CONDITION

Careful management is paramount to maintaining health in geriatric horses. Geriatric patients can have a good quality of life with proper care, but they require close monitoring. Unfortunately, many are turned out to pasture and do not receive adequate surveillance. Since these horses may have poor body condition hidden by a thick hair coat,



...Barbara Dugan, CVT



...Amy I. Bentz, VMD, DACVIM

Ms. Dugan is a veterinary nurse at University of Pennsylvania George D. Widener Hospital for Large Animals, New Bolton Center, Kennett Square, Pennsylvania. Dr. Bentz was in ambulatory practice for approximately 4 years before returning to the University of Pennsylvania George D. Widener Hospital for Large Animals, New Bolton Center, Kennett Square, to complete an internal medicine residency and fellowship in perinatal/neonatal medicine. Ms. Dugan and Dr. Bentz enjoy teaching large animal clinical and emergency procedures to veterinary technician students at Manor College, Program of Veterinary Technology, Jenkintown, Pennsylvania.



photo courtesy Carmeen McCarthy, CVT

Horse 1 has a Body Condition Score of 1/9. Note the horse's thin neck, ribs are readily apparent and the bony pelvis.



photo courtesy Dr. Amy Bentz

Horse 2 has a Body Condition Score of 5/9. This is an ideal weight for this type of horse.



photo: iStockphoto

Horse 3 has a Body Condition Score of 9/9. Note the horse's cresty neck, fat accumulations around the gluteal area and tailhead and pendulous abdomen.

Figure 1 illustrates typical body condition scores for three horses of 1 (emaciated), 5 (ideal), and 9 (obese)

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This is just the beginning.

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**Don't be
left out
in the
cold...**

