

doubletakes

special applications in Fuji digital x-ray

by Peter Ogle

Equine vet finds subtle fractures in elite thoroughbreds with CR

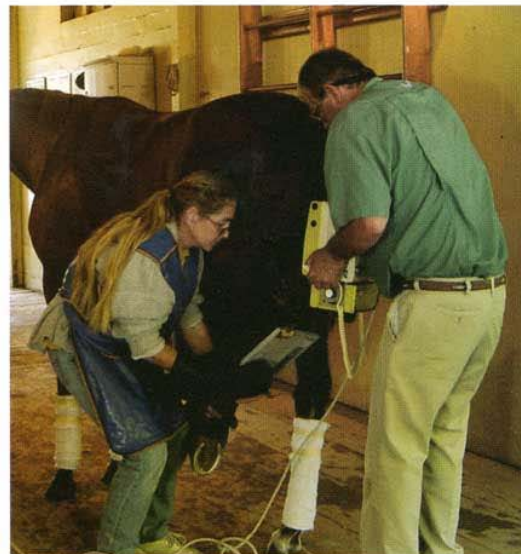
As late as the far turn, Proud Citizen was still within striking distance of winning the Belmont Stakes. But after finishing second in the Kentucky Derby and third in the Preakness, the horse was unable to kick in for a stretch run. It appeared an injury was preventing Proud Citizen from finishing in the money.

After the race, the horse was quickly moved by ambulance to his stable, where his left front leg was examined and computed radiography taken.

Using a SmartCR unit from Fuji, Dr. Stephen Selway processed images that revealed a fracture almost three inches long in the cannonbone (shin), about two inches below the knee. It's not an uncommon injury for racehorses, but because of the extreme density of the bone it is difficult to image well with conventional radiography.

Selway, an equine surgeon with clinics in Elmont, NY, and Hallandale Beach, FL, had installed his CR system only two weeks before the Belmont Stakes. He determined that the shin fracture would not compromise Proud Citizen's career, and the horse will likely race again. Surgery done by Selway after the imaging workup included inserting compression screws to stabilize the horse's cannonbone.

By looking at the CR images, the veterinarian could tell that the fracture did not occur during the race, but that a hairline fracture present for some time had enlarged and destabilized the bone. Just like a human who sustains a shin fracture, the horse probably incurred the injury as a

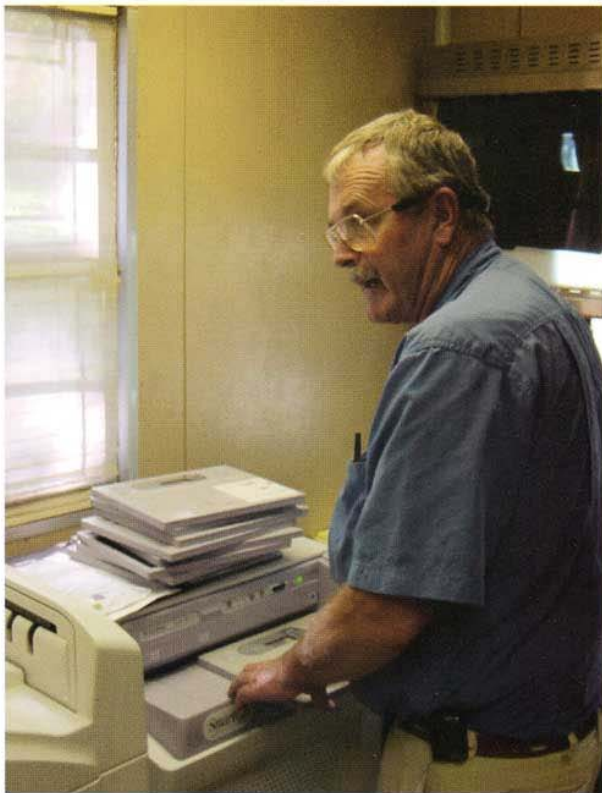


Selway images tarsus bone of racehorse in stables with portable high-frequency x-ray generator. Assistant holds CR cassette, which will be read later at Selway's surgical center.

result of repeated forces placed on the bone, Selway said. More than 25 horses that Selway has imaged with CR had hairline fractures more subtle than Proud Citizen's. Conventional x-ray often does not provide an explanation for a horse's lameness.

"Had these (subtle fractures) not been detected, and the horse not given some rest before going back to training, we could have had a serious breakdown on the race-track," Selway said. "I'm very pleased by what we're able to ascertain with CR."

Selway is not the first equine veterinarian to make extensive use of CR, but he may be one of its biggest enthusiasts. Just as he pioneered the use of arthroscopy in horses during the 1980s, the University of Pennsylvania-trained vet is advancing the science of equine imaging through his hands-on implementation of CR. Working with Imaging Specialist Bill McCoy, Selway is in the process of compiling more than 200 reference images and technique charts for most of the views he anticipates needing in his surgical practice.



Dr. Stephen Selway

McCoy was at Belmont Park on the day of the Triple Crown race and helped with the processing of Proud Citizen's images. "We got some great images, in spite of some limitations with positioning," he said.

The preset algorithms used by Selway take into account the unique anatomy of horses and the high density of their bones. He tried and rejected the settings used by veterinary practices already using CR. Images that he did like from another practice had algorithms that just didn't pan out at his Belmont clinic.

"Bill suggested we just set up the CR with a technique chart that very closely follows what we do with (conventional) radiography, so that we have a good mesh. When we get this process completed, we hope it will be easy to set up CR for other veterinarians," Selway said.

As an equine surgeon, Selway receives most of his referrals from vets in and around Belmont, Aqueduct and Saratoga racetracks who provide the day-to-day care of horses. He sees most of the difficult cases involving lameness in horses trained by some of the biggest names in racing, including Bill Mott, Mark Henning and D. Wayne Lukas.

Because of the absence of healthcare insurance in veterinary medicine, and the inability of their patients to speak to them, equine veterinarians by necessity work closely with a host of interested parties, including trainers, owners, racetrack operators, and jockeys. All have a stake in the advancement that CR provides in the care and well-being of elite racehorses. Word is spreading through the racing community that CR is an important adjunct in equine imaging.

"It gives us the added edge of detecting a problem when it's a very small problem and before it becomes serious, like a completely broken leg, where a horse goes down and a jockey gets hurt," Selway said. "Everyone in racing wants to minimize the risks of injuries to horses and jockeys, and CR is a major step in helping us achieve that goal."

Selway uses radiography for routine studies, and calls CR into action for difficult or ambiguous cases.

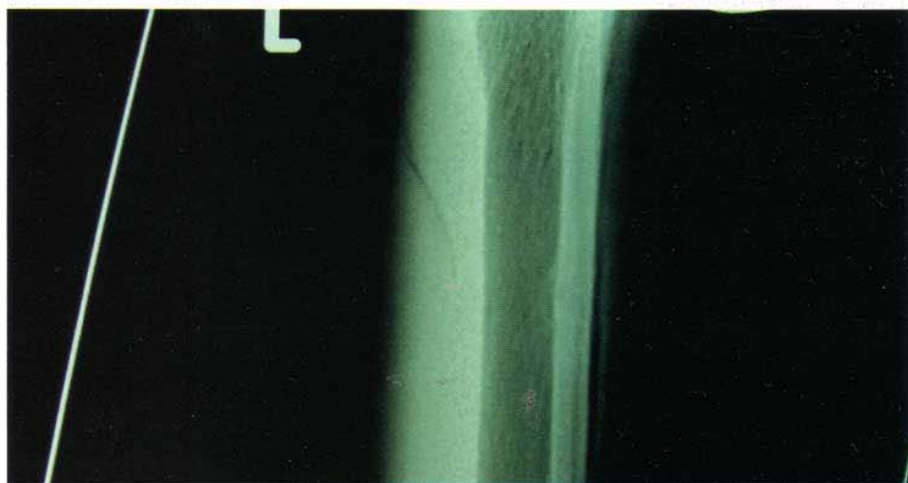
"We use it when we see something that doesn't fit the clinical exam. And since our patients can't tell us where

it hurts, we have to ascertain that," he said. "When we get it narrowed down to a particular area, and we're confident that's where the problem is, and a conventional radiograph is not giving us a reason for the lameness, we're able to go to CR and hopefully find an answer."

Selway noted that CR screening of horses for injuries prior to purchase is not economical, although conventional x-ray is commonly used for this purpose. Here again, however, CR is likely to come into play if there is an anatomical area of concern for which definitive answers are needed.

In addition to installing CR at his other clinic in Hallandale Beach, FL, Selway would also like to have the New York horsemen's group fund the cost of CR at Saratoga Race Course in Saratoga Springs, NY. This would permit him to do his CR reads for horses there without having to make the four-hour drive.

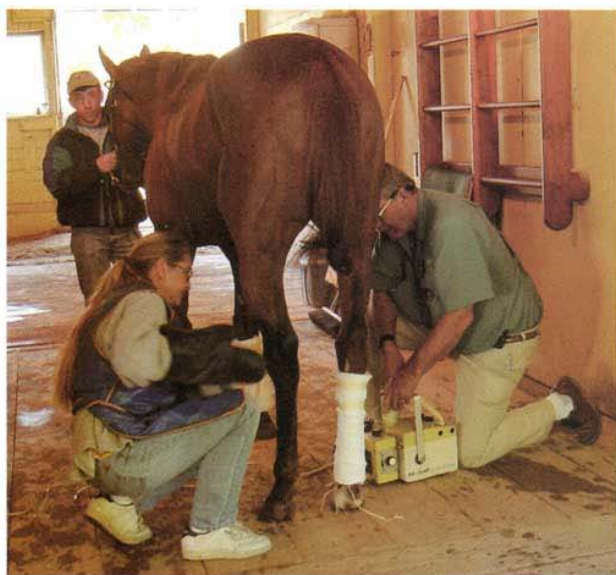
"I could then determine whether I need to go to Saratoga to do a surgery, how to stabilize the horse for transport here for surgery, or whether the horse even needs surgery," he said.



CR image shows fracture in cannonbone of Proud Citizen.

While Selway uses ultrasound frequently for imaging mostly tendons and ligaments, and for respiratory disease, he believes he may eventually be able to use CR for visualizing soft tissue injuries too. Having heard what CR can do, there are several other equine veterinarians in Selway's professional circle who are interested in having the technology.

"The equipment is expensive, but the images sell themselves," he said. "When racehorse owners, trainers and other veterinarians see the difference in the quality of the image I believe they will feel it's worth the increased cost." ■



"Dr. Selway has recognized the advantages of digital imaging..."

— Imaging Specialist Bill McCoy

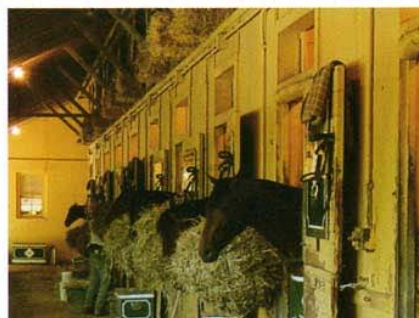
Imaging Specialist Bill McCoy explains challenges of equine CR

"In my experience with equine sites, Dr. Selway's use of computed radiology is unique as it involves imaging very expensive horses in a high-profile environment where diagnostic accuracy is of the utmost importance. A misdiagnosis can result in a career-ending injury for the horse and literally millions of dollars down the drain for the owner. If it's a "race day" injury, there is often the added pressure of a very anxious owner, trainer, and the press looking over his shoulder waiting for the results.

"Dr. Selway has recognized the advantages of digital imaging as it relates to having the ability to apply image enhancements through a wide range of processing algorithms. He utilizes his CR imaging tools as well as anyone I've seen, in an equine or human environment.

"As one might imagine, equine imaging involves challenges that usually don't exist in the human imaging environment. Maintaining the correct OFD (object to film distance) and SID (source to image distance) with ideal positioning and centering is not always easy. With Fuji CR, an otherwise unacceptable image can be salvaged with post-imaging corrections by altering certain processing algorithms, radiographic density and contrast.

"As compared to human imaging, the spatial frequency resolution algorithms are significantly different for horses. A higher frequency rank (RN) and a much higher degree of frequency enhancement (RE) is applied for better visualization of bone trabecular. In addition, dynamic range control (DRC) settings are varied for maximum visualization of the necessary density range and for controlling visualized density." ■



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Fujifilm Medical Systems USA
419 West Avenue
Stamford, CT 06902

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