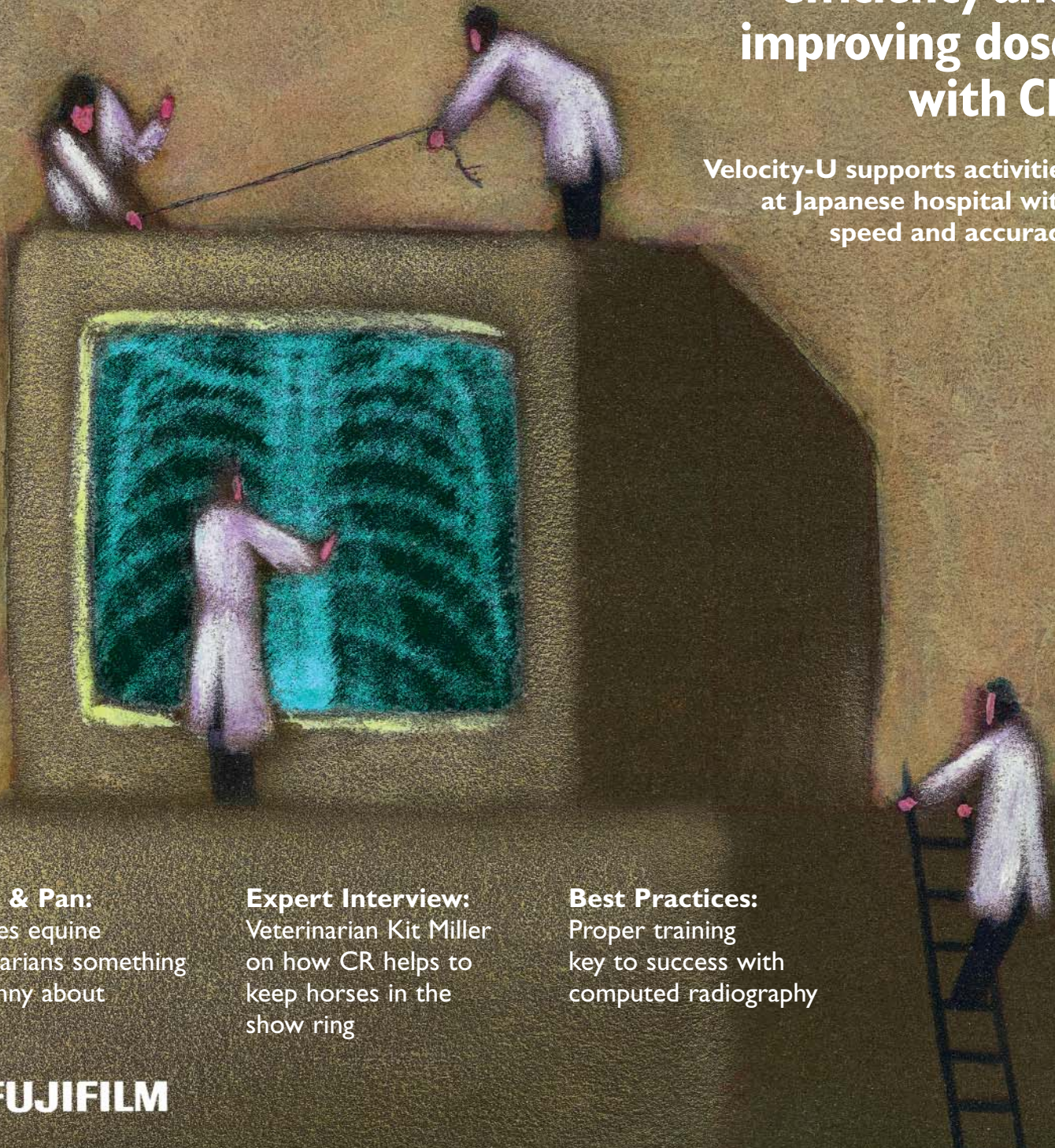


Improving efficiency and improving dose with CR

Velocity-U supports activities
at Japanese hospital with
speed and accuracy



Zoom & Pan:
CR gives equine
veterinarians something
to whinny about

Expert Interview:
Veterinarian Kit Miller
on how CR helps to
keep horses in the
show ring

Best Practices:
Proper training
key to success with
computed radiography

image showcase



Straight from the horses [stifle]

It is difficult to obtain a good PA view of a horse's stifle (anatomic equivalent of a human knee) because of the size of the equine leg. Bony structures are surrounded by such large muscles that without an advanced image processing technique like Fuji's MFP, details of the distal femur and patella are often obliterated, unlike the anatomy seen in the CR image at left. ■

Radiograph contributed by Christopher Miller, DVM

Do you have an interesting image to share with *Insights & Images*? If so, please submit the image with a brief explanation to *Insights & Images*, FUJIFILM Medical Systems USA, Inc., 419 West Ave., Stamford, CT 06902. If your image is selected for publication, Fuji will send you a free digital camera! Please obscure or remove all patient identification information.

quote
unquote

“ The scope of our diagnostics, and therefore our therapeutics,
was limited by not being able
to image the whole horse.

We're so much further along
by virtue of our ability to do that with CR. ”

— Veterinarian Christopher “Kit” Miller,
an equine specialist in Westchester County, New York.

CR gives equine veterinarians something to whinny about

The owner stares blankly at the x-ray of a nearly indiscernible abnormality of her horse's fetlock. The veterinarian points at what appears to be a bone chip, but all the owner can see on the film is the white glare of the horse's leg bone where it meets the hoof. The vet believes he has correctly identified the source of the horse's lameness, but can't be sure.

Just as in human medicine, the care of large animals has been transformed by computed radiography and other forms of digital imaging. Abnormalities that previously eluded detection, or were radiographically ambiguous—as in the scenario above—are being clearly shown by CR. In equine medicine, racing and performance horses that might have been forced into retirement continue to compete as a result of diagnoses that avert debilitating injury.

Talk to vets who use CR and you'll hear them tout the same advantages of digital imaging that radiologists have expressed for years: the ability to visualize and diagnose subtle injuries; arriving at a final diagnosis sooner and more accurately; the convenience of being able to call up priors and to make image comparisons.

There is also the notable advantage of being able to image anatomy, like the shoulders and cervical spines of horses, that previously would not have been attempted. With post-processing of CR data, helpful studies can be generated where film-screen radiography fails. Protocols and imaging pre-sets have been tailored to the larger anatomy of horses.

Equine veterinarians go places with CR that radiologists can scarcely imagine. Most imaging is done in the field—or to put it less politely, in the barnyard. The portable systems they use require a hands-on familiarity with x-ray generators, and a trusted vet technician to hold the imaging plate. Things can get chaotic when imaging an injured horse, which can weigh up to 1000 pounds or more, and it's not unheard of that a cassette is exposed twice in the process of getting a job done.

The payoff, of course, is a satisfied customer. In the story that starts on page 6, equine veterinarian Kit Miller describes how CR has become integral to his private practice and advanced his group's reputation among horse owners and fellow vets. By embracing CR, Miller and other veterinarians like him are keeping horses healthier and extending the horses' competitive careers. Now there's something to whinny about. ■



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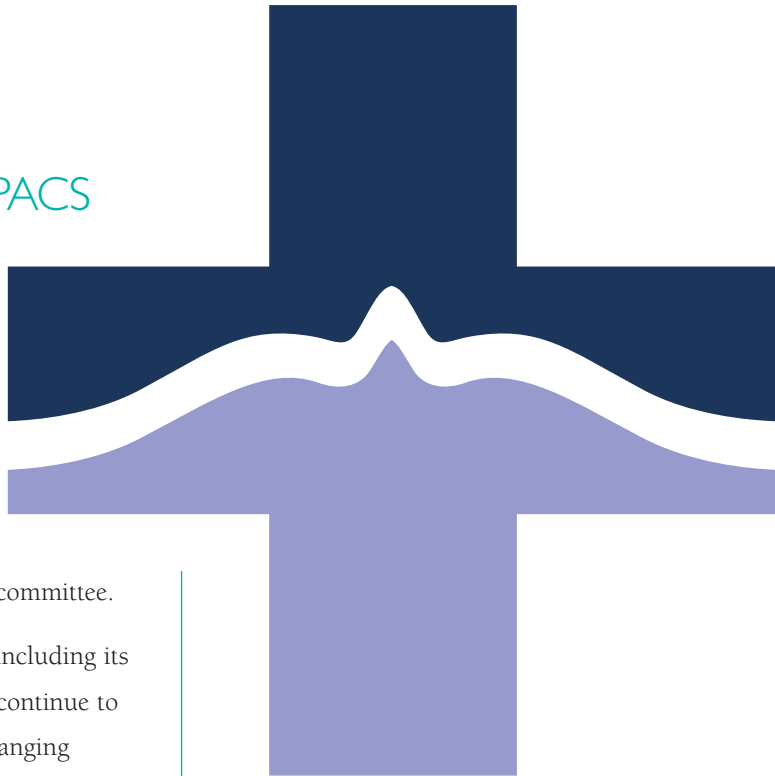
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Centura selects Synapse PACS

Centura Health, the largest healthcare system in Colorado with 12 hospitals and 2,300 beds, has selected Fuji's Synapse as its replacement PACS. The choice was aided by the fact that the region's two largest radiology groups already use Synapse and physicians in the system recommended it to Centura's PACS selection committee.

"We chose Synapse for a number of reasons, including its ease of use, and because we believe Fuji will continue to add innovative features that anticipate our changing needs," said Dr. Michael Shrift, chief medical information officer for Centura Health.

One of the key purchase considerations was the fact that Synapse is truly a software-only solution, allowing Centura to utilize its existing hardware. Shrift said the PACS selection committee was also impressed by Synapse CommonView, a unique technology that will enable Centura's radiologists to have immediate access to every exam performed on a patient in any of the 12 facilities, despite separate databases and information domains. ■



FDA receives final module for CR mammography

Fuji has submitted the final module of its pre-market approval application with the Food and Drug Administration for approval of Fuji Computed Radiography for Mammography (FCRm). The company is seeking approval for its mammography software, which will enable the technologist console and a multi-plate CR reader (currently 510(k) cleared for general radiography) to process digital mammography exams. ■

PACS administrator wins scholarship to conference

Richard D. Young, the CR Coordinator at WestCare Health System in Sylva, NC, won the second annual PACS Administration Scholarship at the Society for Computer Applications in Radiology (SCAR) meeting in May. Valued at more than \$2000, his scholarship included registration for the meeting, the pre-conference PACS Administration Overview Course, SCAR membership, and airfare and hotel accommodations for the meeting.

“I want to thank Fuji for its gracious support of this scholarship, which has enabled me to take the next step on my path to gaining the knowledge I need to become an effective PACS administrator,” Young said. “This is a tremendous opportunity not only for me, but for my facility because it will allow me to do the best possible job for everyone who will benefit from the deployment of this technology.” ■



SCAR officer Katherine Andriole, PhD, and Clay Larsen, vice president of marketing and network development for Fuji, present the PACS Administrator Scholarship award to Richard Young of WestCare Health System, Sylva, NC.



Feds issue patent for PACS technology

The U.S. Patent and Trademark Office has issued Fuji its first patent for Synapse PACS technology. Specifically, the patent is for Subscription, a unique Synapse technology that is designed to allow users to implement flexible workflows and optimize the use of network bandwidth.

Subscription works in much the same way as one might subscribe to content from a Web site. It allows users to “subscribe” to a Synapse folder and receive notification when new content, such as unread studies, arrives in that folder. In essence, it creates an on-demand model enabling users to selectively bring the content they need directly to their workstation.

“The nature of our business is remote reading, and our customers rely on us for quick turnaround time,” said Brent Backhaus, chief technology officer of Virtual Radiologic Consultants. “Synapse’s Subscription allows our radiologists to live anywhere they choose and still feel like they are reading in a hospital at a speed typical of a hospital network.” ■



Improving efficiency and reducing dose with CR

Velocity-U supports activities at Japanese hospital with speed and accuracy

Among the imaging modalities commonly used in the planning of orthopedic surgery—radiography, CT, and MRI—the projection x-ray is still the most pervasive and essential. In Japan and elsewhere, the digitization of the x-ray exam is rapidly progressing with Fujifilm’s FCR (Fuji Computed Radiography) having established the largest installed base.

Koshigaya Hospital, which is a part of Dokkyo University’s School of Medicine, is making good use of CR for accurate and rapid diagnoses. The basic policy of this hub hospital in Koshigaya City (Saitama Prefecture) is what it calls “joint medication,” which calls for the use of PACS to join hospitals and clinics into an electronic network. At present, Koshigaya Hospital is in the process of digitizing and networking the data in its affiliated hospitals and clinics.

Masahiro Nakajima, a radiographer and pioneer in digital imaging in Japan, has first-hand experience with the installation of the FCR unit, which is primarily used for planning orthopedic surgery at Koshigaya Hospital.

One of the first problems the hospital encountered when planning for digital radiography was the small space of the x-ray room, Nakajima said. It was for this reason that planners didn’t even consider installing an upright image reader, but opted instead for a compact cassette-type CR.

“When taking x-rays of the cervical vertebra, shots from six different angles are necessary. This means that a different cassette must be used for each angle, and this has to be repeated six times. This process was much too burdensome and time-consuming for us,” Nakajima said. “Just as we were weighing these factors, we heard that Fujifilm was coming out with a compact, high-performance CR suitable for our requirements.”

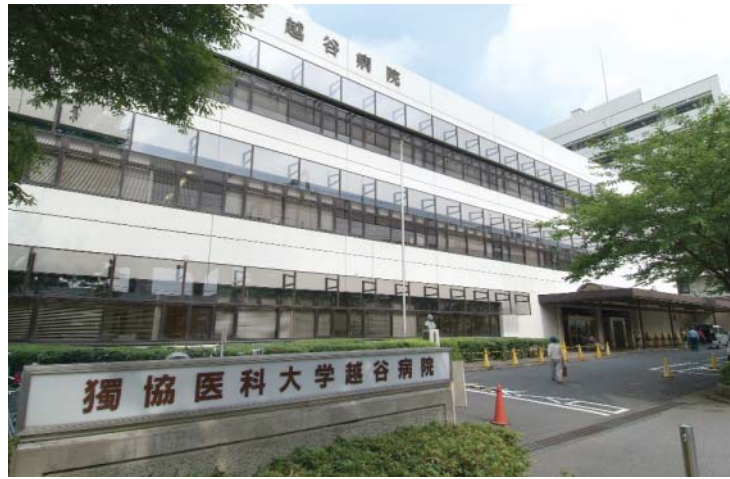


Radiographer Masahiro Nakajima

In September 2004, Fujifilm announced a new model of the FCR unit, the Velocity-U, that uses HD LineScan technology. The unit is the fastest FCR upright image reader and is an enhancement of its predecessor—the FCR5501 Plus. It is speedier, more compact, more functionally designed, and uses a new image processing technology. It also facilitates a more efficient on-site workflow, Nakajima said.

A maximum of 240 imaging plates per hour at 10-pixel resolution can be processed with the unit regardless of image size, thus allowing the hospital to speed up throughput.

Operating hours at Koshigaya Hospital are 8:30 a.m. to 5 p.m. daily, during which an average of 400 people are imaged by CR. On average, two views per patient are taken, which creates a total of about 800 images a day. Mornings are devoted to outside patients and afternoons to hospitalized patients.



Koshigaya Hospital, which was established in 1984, has a staff of 232 doctors.

“After installing the Velocity-U, I was able to reduce processing time from 30 seconds to 9 seconds,” Nakajima said. “Due to the speedy display time on the console, imaging retakes consume less time. This results in shorter waiting times for our patients.”

Characteristics of the Velocity-U that make it easier to use are grids that can be easily removed on-site, and a center of the image that can be lowered to 47 cm from the ground, which enables the lower extremities to be x-rayed.

“Sometimes when I take an image of patients with an abnormality at the waist, I have to make them bend forward or backward, which is painful for them. Other times, there are patients who cannot hold their breath for a long time. The Velocity-U is very useful at such times because of its short processing time and flexibility,” Nakajima said.

After using the Velocity-U for several months, Nakajima discovered that high-quality images could be obtained with a lower exposure dose, which subjects patients to less radiation risk. He conducted experiments using the Velocity-U to prove that the exposure dose could be cut by 30% compared to film-screen radiography.

“If I may say so, the x-ray image is not an artistic piece of art and therefore does not require the high resolution of a masterpiece. Resolution sufficient to diagnose the condition of the illness is all you need,” Nakajima said.

The radiographer believes it is his ethical responsibility to decrease radiation exposure to patients as much as possible.

“I would like to stress that we, as responsible radiographers, should be more aware of the patient’s well-being and strive to decrease the dose they receive,” he said. ■

Private clinic in Finland goes filmless with Fuji CR

The first FCR Velocity-U in a private European clinic was installed last year by Rontgentutka Corporation in Tampere, Finland. The cassette-less unit is designed for chest and other upright exams, which at this site are scanned by a FCR 5000R reader. “From the beginning, Velocity was as fast as promised and its throughput has enabled us to reorganize workflow in the clinic,” said Dr. Alpo Karkkainen, managing director and chief radiologist at Rontgentutka Corporation. “Compared to film cassette workflow, the investment in Velocity will be paid back soon.” ■



Veterinarian Kit Miller on how CR helps to keep horses in the show ring

Veterinarian Christopher “Kit” Miller is an equine specialist in Westchester County, about 50 miles north of New York City, and a pioneer in the use of digital imaging in performance horses. In an interview with *Insights & Images*, Miller describes how FCR (Fuji Computed Radiography) has helped to improve the care of horses in his four-person practice.

I&I: Tell me about your practice.

Miller: It consists almost exclusively of performance horses, most of them jumping horses. We also take care of three-day event horses, some dressage horses, and a smattering of pleasure horses. What we’re involved in is performance medicine.

I&I: Please explain that.

Miller: We’re usually employed to diagnose performance-limiting conditions, such as forms of arthritis and soft-tissue injuries. We try to help people manage them by some combination of therapy. We’ve been using digital radiography for just over three years, and were among the first (equine veterinarians) to use it.

I&I: How important is digital imaging to your practice?

Miller: I’m fortunate to have a guy who works for me (Antoine Renault) who’s very knowledgeable not only about horses but also computers. I taught him to take radiographs, and so I’ve started a concession where we take radiographs for other vets.

I&I: When did you get started with Fuji CR?

Miller: We got the Fuji system last winter. We had some exposure to Fuji systems from other veterinary practices, and so when we decided to add CR to what we already have, we didn’t feel the need to shop around. We still use direct DR too.

I&I: How have you found CR useful?

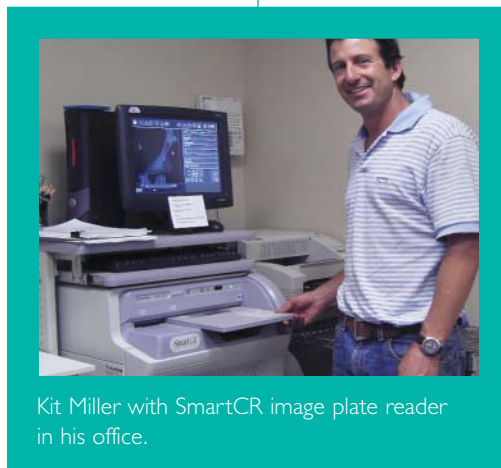
Miller: We use them (CR and DR) interchangeably, and there’s nothing we image with one that we don’t with the other. One of the disadvantages of DR is that it uses a 9-by-11 cassette, and that’s all you get. With CR, we use 8-by-10, 10-by-12, and sometimes 15-by-17. Now that we know how to take good cervical radiographs, the large cassettes are ideal; you can shoot a horse’s whole neck in three exposures.

I&I: How do you decide on the view you need?

Miller: It’s mostly a matter of knowing the anatomy. About 90% of the radiographs we take are of the distal limb. Most of the joints we image are in the distal limb, so once you have a good working knowledge of the anatomy, the views are very standard. We take a lot more views than they do in small animal medicine or in humans. In a metacarpophalangeal joint, for example, we typically obtain at least five views, including APs, laterals, and obliques from both sides. We pretty much cover our bases on every joint.

I&I: What portion of your business is imaging?

Miller: We’re full-service veterinarians. We take care of sick horses, and sew up cuts and eye injuries—things like that—but the part that we have really worked to develop is offering the highest-end imaging possible that we can take to the animal. This is the portion of the practice that I spend most of my time. The other thing that has been a byproduct of having been among the first to get into digital is that we also do a lot of work for other veterinarians, and that’s been great.



Kit Miller with SmartCR image plate reader in his office.

With help of technologist Peter Mutz (left), Kit Miller obtains radiograph of horse's forefoot using FCR and portable generator.



I&I: How would you describe the difference between digital and film-screen x-ray?

Miller: The main advantage, of course, is that the image quality is far superior. That's not to say that we missed a lot of diagnoses with conventional x-ray; it's just that digital has enabled us to not only obtain better images of the anatomy that we have always imaged, but that it's also allowed us to do things like cervical spines and shoulders that we wouldn't have even bothered to try before.

I have to add that the ability to archive images is at least as much of an advantage as the imaging quality itself. It's extremely helpful to see priors, to do side-by-side studies, to call up images from the same horse on a previous series, or to be at a remote location and be able to access images.

I&I: How much do you print to film?

Miller: Never. We read everything on a 5-megapixel gray-scale monitor in the office. Printing radiographs completely defeats the purpose of digital x-ray for me. I don't want to have to read them and then store film. We were unique in terms of (veterinary) customers for Fuji so far as doing only soft-copy review of images. The image processing was geared much more toward the hard copy, and it took some processing changes to get what we considered good-quality images on the monitor.

I&I: Your plate reader is at your office?

Miller: That's right. We must have about 50 to 60 image plates, so we don't run short. A big factor for us in going to the CR system after having had the direct DR is that we wanted to be completely rid of film. As long as we had a DR system or even two DR systems, that still meant

there were two vets without x-ray equipment. With CR, every vet has access to the digital system.

I&I: Because you're imaging such large, heavy animals, do you find the need to take repeats of studies?

Miller: Very few. If it's a repeat, it's not because of an exposure problem. The only time we need to repeat a view is if there was motion on the film—the horse moved—or we just didn't like the positioning.

I&I: What injuries do you image mostly frequently?

Miller: Because they have such a protracted career, most of what we try to do is manage musculoskeletal issues. Performance horses suffer wear and tear over their career, so in our business as opposed to, for example, the race horse business, we're looking at a lot of chronic condition that often involve multiple limbs or joints. We put together the pieces of the puzzle and devise a therapy regimen so that the horses can stay comfortable and sound and competing. We don't see a lot of traumatic injuries, such as fractures. It's primarily arthritic conditions, in combination with soft tissue or muscle problems.

I&I: What's on your diagnostic wish list?

Miller: My list would include the ability to generate some kind of multi-slice radiographic image in a standing horse, and then do some form of three-dimensional rendering of it. I'd love to take radiograph like a dentist where the camera pans across the surface, and then do a 3-D reconstruction. We'd do this primarily for the hooves of horses. That's still a black box for us. There's so much anatomy in there and it's so difficult to get to. ■



By Bill W. McCoy,
Clinical Development Manager,
Imaging Systems with
Fujifilm Medical Systems, USA.

Proper training key to success with computed radiography

Once a user has installed a Fuji computed radiography system, a member of our professional services team provides on-site training and helps to optimize image quality for the radiologists. Our objective is to insure a smooth introduction to CR technology for the entire staff.

To maintain consistently good image quality, it is important to understand the simple but significant differences between CR and conventional screen/film radiography. It is equally important to abide by “the rules of CR,” just as one abides by the rules of conventional screen/film imaging when using that technology. Users must learn CR well and accept responsibility for making the necessary changes. For best results, radiology managers must learn the technology themselves so they can encourage, motivate and support their staff. If management buys into CR, experience has shown us that the rest of the staff will too.

Compared to conventional screen/film systems, which have a fixed speed, CR can be considered a multi-speed system. The image capture device (imaging plate) used in CR employs a linear capture of exposure far exceeding the capabilities of any conventional film/screen system. For all imaging modes (except fixed mode), the system centers the exposure data for processing, and optimizes density and contrast for display. Therefore, as exposure is increased or decreased, density and contrast will remain consistent, in contrast to conventional film/screen systems.

As dose decreases in an electronic imaging system, noise from the amplified lower signal increases. It is the responsibility of the facility to establish exposures ranges that employ the lowest dose based on the image quality desired per exam. Fuji CR offers a tool called the “S” value to help judge the exposure used on each exam. This value is an indicator of the photostimulable luminescence given off by the imaging plate (IP) when scanned by the laser. The range of the “S” value is zero to 20,045. The values are inversely proportional to the amount of radiation that strikes the IP. Underexposure is exhibited by a high “S” value—generally greater than 500. An underexposed image will have a greater amount of quantum mottle (noise) in the image.

Dosage can be minimized by accepting more noise. If converting from a 400-speed film/screen system to CR, it’s possible that adjustments in technique will be required for some exams. To minimize the quantity of radiation and exposure time, an increase in kVp may work as it relates to keeping the “S” value/noise within an acceptable range. A 12 to 15 kVp increase would be equivalent to doubling the mAs.

How training is conducted

For sites that have installed a single CR reader, three days of initial training is provided. On the initial visit, minor adjustments are made to the equipment to customize menus and configurations. For best results, no more than three technologists are trained per session. Small groups allow the pace of learning to be adjusted to suit the experience of each trainee.

Fuji also recommends a “train the trainer” concept by designating a few especially qualified technologists to become “specialists” or in-house trainers. The designated in-house trainer works with the Fuji Imaging Specialist during the entire visit and is provided additional training. We’ve found this approach to be extremely helpful, and encourage it when staffing permits. An example of some of the material covered includes the following:

- Startup and shutdown
- Basic CR principles
- Imaging plates/sensitivity
- Grid usage
- Proper centering/collimation
- EDR (Exposure Data Recognizer) function
- Erasing imaging plates
- Inputting patient information
- Icons and menus
- QA functions
- Cassette and imaging plate maintenance
- Alarm codes

After the initial training period, a follow-up visit is scheduled four to six weeks later to address any questions and to complete any image optimizing that may be requested.

Advanced “Champions Course”

In addition to on-site training, Fuji's Professional Services Department offers an advanced CR “Champions Course” at the Stamford Learning Institute in Stamford, CT. This course is designed to train regular CR users to become “super-users” and provide them the information and tools to be on-site experts.

This program provides a focused learning experience with uninterrupted access to the complete line of Fuji CR products, printers, and Synapse PACS. The curriculum incorporates many didactic sessions supported by hands-on clinical sessions using operational x-ray equipment and phantoms.

Students learn all aspects of CR imaging, from image capture to image processing and display. A complete day is dedicated to the image QA process. Advanced user

options, such as security settings, image stitching and site-accessible user utility equipment functions, are taught by Fuji senior imaging specialists.

The five-day program offers Fuji CR certification and 23.5 category A credits from the American Society of Radiologic Technologists. Classes, which are scheduled quarterly, are limited to 10 attendees. For more information, contact Scott Matola via email at scott.matola@fujimed.com ■



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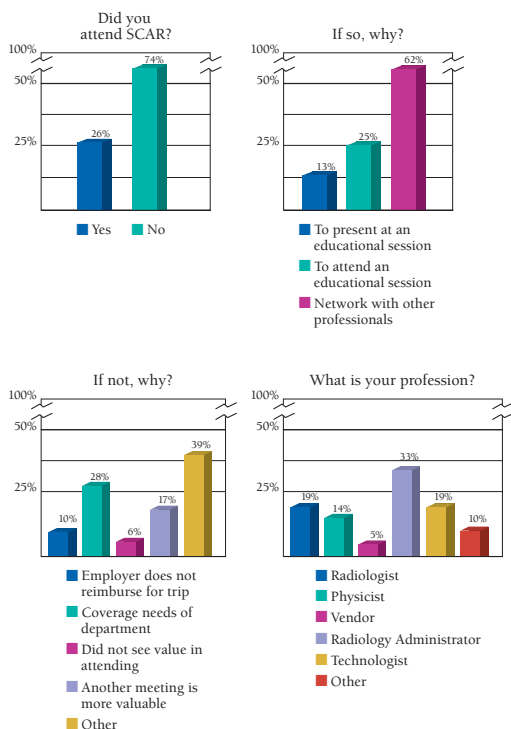
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Note: percentages are rounded to the nearest whole number.



readers poll

Even if you are already a subscriber, we want to hear from you! Please take a few minutes to participate in this anonymous poll by logging on to www.fujimed.com/landsurvey.asp. See what your peers think. Results will be posted in the Fall/RSNA issue of *Insights & Images*.

If you were to buy digital x-ray technology for your facility today, what would you purchase? CR DR Both

Have you purchased any technology like this recently? Please explain.

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