

THE FUTURE WITH DIGITAL RADIOGRAPHY by Rob Moorhead

Major changes are on the horizon for radiography in Equine practices. Radiography has established itself as an essential part of the diagnostic work, especially with the increase in yearling and pre-purchase X-rays. Traditional radiography is being revolutionized by digital radiography overseas. It has been described as the 'gold standard' compared to the film based radiography.

Two forms of digital radiography are in use in veterinary practices, these are Direct radiography (DR) and Computed radiography (CR). I will discuss the pro's and con's of each and then will conclude with the economical considerations that are necessary before committing to a Digital system.



Both DR and CR follow the principles of traditional radiography, including X-ray, exposure and light. They use the same X-ray machine as traditional X-rays except for the addition of a small adaptor that controls the factors on DR systems. They both produce high quality digital images that can be viewed on a computer screen.

The DR uses a single detector that is attached to the computer with a six metre fibre optic cable. A few seconds after the image is exposed it appears on the computer screen. It is possible to assess the positioning and quality to ensure a re-take is not necessary. A diagnosis can be made then and there, although it maybe preferred to return to the clinic and load it onto a central server for storage. Then it can be viewed on a on high resolution monitor to make a final diagnosis. The DR is more compact, and easily transported, however you can only operate one X-ray per DR system, as they are connected by the cable.

CR uses cassettes similar to those used with film and you require a new cassette for each view that is taken. The exposed cassette is placed in a reader, and the image appears on the screen about one minute later. When using CR, X-rays can be taken at different places at the same time and still use the same CR system. This system operates well in the hospital situation but is not as efficient when the X-rays are being taken away from the clinic as it is not possible to view the image before you leave the stud or stable.

In America CR systems have been installed and operating in the large clinics for several years, and more recently the DR systems have become very popular in other clinics. The digital radiography eliminates the need for film, and its related processing and storage requirements. Digital radiographs can be stored on CD's, in databases or on a central server. The images are consistently of a much higher quality and the need for retakes due to incorrect exposure factors is eliminated. Digital copies are exact duplicates of the original image, compared to copying traditional films which can have reduced quality.



Digital Radiography offers superior images to traditional methods in almost all instances. It is easier to identify bony changes by using the windowing and leveling properties that allow you to adjust the image contrast and brightness. It is more efficient at finding fine bone detail and soft tissue images together in one view. Features such as a magnifying glass and measurements are an advantage when describing lesions or measuring pedal bone rotation. Radiography of the head, cervical vertebra and thorax in foals are considered to be quite challenging with regular X-rays, but with digital radiography viewing these is made much easier.

With digital radiography images can easily be e-mailed or saved onto a compact disc. Then the information can be sent to the referring veterinarian, or forwarded for a second opinion by a surgeon. The CDs can be produced at very low cost, and it gives the trainer or owner the option of keeping their own copy of the radiographs.

The DR system allows images to be evaluated at stables or horse events with the trainer or owner present. This enables the veterinarian to rule out many fractures or catastrophic bone injuries very quickly. Similarly with time sensitive situations like pre-purchase examinations, the results are available almost immediately. However the advantages of this must be considered in conjunction with the risk of the veterinarian making a hasty decision or making an incorrect diagnosis.



There is the concern that the radiographs can be tampered with to a degree that some lesions may be less easily identified or eliminated. The integrity of the digital systems is the same as traditional radiography in that the veterinarian is responsible for the accuracy of the images representing the horse being X-rayed. The digital system should be set up so when the image is stored it conforms to the recommended standards , it can not be altered or enhanced.

DR Systems have the potential to create the greatest impact at the Thoroughbred Yearling sales. There is presently a lot of work being done world-wide developing procedures to facilitate the introduction of fully digitalized radiography in the repositories. How the images are presented in the repository maybe contentious. Initially it maybe necessary to make hard copies, that look very similar to regular films with a higher sheen. These are viewed on a regular viewer and stored in the repository like all the films are now. In the future they maybe available on CD, or via a server, they would then be viewed electronically on a computer screen.

Unfortunately the restricting factor of the introduction of DR Systems is the cost of these systems. This will delay the use of this equipment in Equine practices, where there would be the greatest advantage. Several practices would have sufficient case load to justify the expense, however as you require a system with each X-ray machine, the cumulative cost would be prohibitive. The perceived resistance by owners to any price increase, especially for yearling radiographs, has to be dispelled by the explanation of the benefits of this advanced technology. There would be obvious advantages for prepurchase examinations and for rapid diagnosis of clinical cases. The question is how much more will our clients pay for what is essentially the same material produced more effectively and efficiently.

There is a number of suppliers of DR Systems in America, and they vary in price considerably. The systems cost approximately US\$100,000, which includes set-up and training programs. With an investment like this it is important to deal with a reputed supplier that offers good follow up service with international experience. The technology is always advancing and already some systems are available on laptop, which makes it very portable.

I am confident that Digital Radiography will benefit everyone in the future, and when the demand is there, the technology is available for the profession to offer a superior form of radiography.

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