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## **Is Your Practice Ready for Computed Radiography?**

By Gerard Clum, DC

The college received a tremendous number of calls and e-mail following the publication of the first article on this subject, "Life West Makes Waves With New Digital Radiography System."<sup>1</sup> Most of the inquiries were related to the conversion of film-based X-ray systems to a computed radiography environment, and the related costs. This article addresses those considerations.

Computed radiography (CR) is an interim step between traditional film radiography and digital radiography. The process of converting to CR has been described as a "retrofit" approach. In any retrofit project, elements of the original environment are maintained, while the particular enhancement is merged with the existing systems or structures. Conversion to CR from film-based radiography fits this model.

The ultimate conversion to a digital environment of diagnostic imaging is a direct-capture system, whereby the digital signal created by the penetration of ionizing radiation passes directly into the computer system. The interim method between film and direct capture is CR. The reasons to go to a CR technology, as opposed to a direct-capture technology, are predominately cost-related. The bottom line: CR is cheaper than direct-capture.

The "retrofit" approach to moving into digital-image capture and retrieval makes the most sense in a medium or large chiropractic clinic environment. In the small-office environment, it does not make economic sense to convert to CR. That being said, each practitioner needs to set the return-on-investment (ROI) that is comfortable and acceptable in his or her operations. The clinical ROI is a no-brainer: If cost weren't an issue, it would be wise for everyone to convert to CR.

In the retrofit model, your X-ray machine, transformer, bucky, etc., do not change one iota. The change is in the medium used to capture the image. In the CR format, film is no longer used, and image capture is accomplished by means of a digital recording plate that replaces the film in your standard cassette.

Logically, if film is not used, neither are a darkroom or its associated chemicals. This is an important aspect of evaluating the ROI question. How many direct expenses (film, chemicals, supplies, parts and labor) and indirect expenses (staff time, etc.) are eliminated in a CR environment? As savings mount with respect to these items, the cost of CR conversion becomes relatively less of a burden.

The next functional aspect of the CR conversion is a change in exposure factors. CR utilizes higher kV and lower MA. In the film environment, the patient is overexposed and the image "developed-up" to the desired point. In CR, the patient is underexposed and the computer enhances the image up to the desired level.

The darkroom part of the process is replaced by a "digital reader." This is a device that fits on a desktop and is somewhat larger than a laser printer. The cassette is brought to the area of the digital reader (it can be opened in a white light environment), and the digital card is removed and passed through the digital reader in the same fashion as a document would be fed into a fax machine. A 14"x17" scan takes approximately 55 seconds to "read." Following the collection of data from the digital card, the card is exposed to a bright fluorescent light, which cleans or erases the image formerly retained on the card. The digital card is then reloaded into a cassette and used between 3,000 and 5,000 times. The life expectancy of the digital card depends on how carefully it is handled.

Because bright fluorescent light is used to clean the digital card, it is smart to limit or remove fluorescent or bright incandescent light from the area where the exposed card will be removed from the cassette and fed into the reader.

By the time you have closed the cassette, the digital image of the X-ray exposure is available on the monitor of the computer system accompanying the digital reader. At this point, the identifying data of the patient, office, etc. are added to the image and you are free to go about enhancing, marking and copying the images to various media.

It was noted earlier that CR was less expensive than direct-capture digital radiography. In the direct-capture environment, the bucky or table top has sensors embedded to accomplish the task of the digital reader card and digital reader; moreover, the data go directly into the computer and an image is generated.

The cost of a CR retrofit is similar in nature and expense to purchasing a luxury automobile: The more features you want, the more money you will spend. These "features" include the number of workstations to be added to your configuration; a scanner to convert existing film images to digital images; "stitching"

software that allows you to take a 14" x 17" A-P cervical-thoracic image and a 14"x17" lumbopelvic image and "stitch" them into one full spine image; and a projection system for reviewing images in a larger format/setting.

The sticker price on a CR retrofit is comparable to a well-equipped Lexus-about \$45,000-\$50,000, or about \$1,000 a month on a 60-month lease.

There are several points in the life cycle of a practice at which conversion to CR makes greater sense. For example:

- If you are completing tenant improvements (TI) on a leased facility and you can forego the expense of a darkroom design, plumbing, processor, chemicals, etc.
- If you are completing the design of a new office, you can eliminate the construction costs of a darkroom and its associated expenses. You can also eliminate, or generally minimize, your space allowance for film storage. If construction costs run \$150 a square foot, 300 square feet dedicated to film storage pays for the CR system.
- If you are upgrading or replacing your processor and/or cassettes, CR can be a more reasonable transition.

Retrofitting your office to CR is not inexpensive, but with the scope of tangible (dollar) expenses and intangible advantages (better image quality, less radiation exposure, greater utility, and protection for you and your patient), it may be a viable option.

We would be pleased to have you visit Life West, tour our imaging department, meet with our imaging faculty and use our CR images to allow you to get a better feel for the benefits of the technology. For more information, please contact Michael Hurschmann at 510-780-4500 (ext. 2350) or [mhurschm@lifewest.edu](mailto:mhurschm@lifewest.edu).

#### *Reference*

1. *Dynamic Chiropractic*, Sept. 13, 2003. [www.chiroweb.com/archives/21/19/11.html](http://www.chiroweb.com/archives/21/19/11.html).

*Gerard Clum, DC*

*President, Life Chiropractic College West*

*Hayward, California*



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