# Treadmill Workstations Get Radiologists Moving

RADIOLOGISTS can add simultaneous physical exercise on a treadmill to their daily image reading routines without compromising diagnostic accuracy, according to an exhibit presented at RSNA 2008.

"Radiologists have a relatively sedentary workday in comparison to other healthcare workers and especially in comparison to other workers in general," said Amee Patel, M.D., a resident at the University of Maryland Hospital and Baltimore VA Medical Center, who presented "Walking While Working: A Demonstration of a Treadmill-based Radiologist Workstation."

"Radiologists can increase their energy expenditure by a factor of more than 2.5 by walking on a treadmill for a portion of their day, even at only 1 mile per hour," said Dr. Patel.

Dr. Patel and colleagues tested a combined treadmill and workstation, called a walkstation, in a pilot involving detection of lung nodules on conventional chest radiographs. Performance was measured with radiologists sitting, standing and walking.

The concept of adding physical activity to sedentary work is not new—combined work/exercise equipment is gaining popularity in healthcare and other professions with offerings from a number of manufacturers.

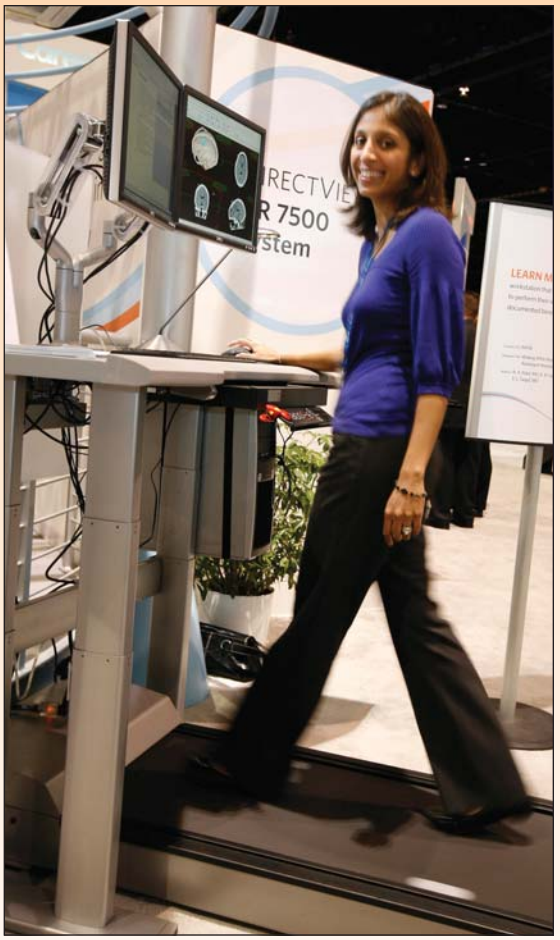
Dr. Patel said her study addresses concerns about distraction and loss of accuracy for radiologists. "I think these are valid concerns," she said. "That is the precise reason studies should be done to provide scientific data showing how performance while on the walkstation varies from the traditional reading room where the radiologist sits in front of a workstation. This was our goal when we conducted our pilot earlier this year."

### No Significant Difference in Accuracy Seen

Results showed sensitivity and specificity, respectively, of 71 percent and 77 percent for sitting, 76 percent and 69 percent for standing, and 80 percent and 56 percent for walking. "Our study showed no significant change in the accuracy in the detection of lung nodules on chest radiographs among three image interpretation modes," Dr. Patel said, noting that there was also no evidence of memory effect. "Not only have we found that radiologists can use a walkstation while interpreting diagnostic imaging studies, but we were unable to find any decrease in diagnostic accuracy," she said.

Regarding the increase in sensitivity—but decrease in specificity—from sitting to walking, Eliot L. Siegel, M.D., offered a theory. "A very well-known radiologist, the late Dr. Ben Felson, wrote in his famous 'red book' about a 'cowboys and Indians' phenomenon, in which the Indians were able to see better because, in fact, their heads were bobbing up and down, either on the run or on a horse," said Dr. Siegel, a professor of diagnostic radiology and nuclear medicine at the University of Maryland Medical Center and a member of the RSNA Radiology Informatics Committee. "Perhaps the same factors are at play with the walkstation. I haven't even talked to Amee about this yet, but I'd love to do a phantom study with different objects of different sizes and test the effects of movement on visualization."

Responses to the walkstation have been varied, said Dr. Patel. "Some people liked the prospect of increasing activity levels while doing their work because they were naturally active individuals," she said. "Others found the apparatus distracting and preferred to sit



Amee Patel, M.D., and colleagues tested a combined treadmill and workstation, called a walkstation, in a pilot involving detection of lung nodules on conventional chest radiographs. Performance was measured with radiologists sitting, standing and walking.

down during read-outs." She suggested a stationary bicycle might be more readily accepted by those radiologists.

The walkstation is configured with three monitors and its treadmill can be set at speeds from 0.3 to 2.0 miles per hour. "The treadmill is specially designed to be quiet in order to minimize distraction from noise and the potential negative impact on speech recognition," said Dr. Patel.

To implement systems like the walkstation into daily practice, Dr. Patel recommends that radiologists give themselves time to acclimate to the system before attempting to regularly read studies while on the treadmill. "Most people who have tried the apparatus agreed that it takes time to adjust to the concept of moving while reading studies," she said.

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**Amee Patel, M.D.**

"Also, it is important that radiologists maintain good ergonomics with regard to their height in comparison to the monitor—they should be looking straight at or down by no more than 10 percent at the monitor, should be approximately 22 to 25 inches from the monitor and should have a comfortable angle to hold the mouse or track ball," Dr. Patel continued.

Monitors should be mounted in such a way as to minimize vibration, she added.

## Safety Just as Important as Ergonomics

Also presented at RSNA 2008 was a study showing the effectiveness of modular, lead-lined shielding in reducing staff exposure to radiation.

Radiation exposure to staff at Hillman Cancer Center in Pittsburgh dropped by 15 percent in unrestricted areas when modular, lead-lined uptake shields were used, according to lead author Francis Talbot, M.B.A., C.N.M.T., an account executive with IBA Molecular in Dulles, Va.

Originally designed in 2002 to accommodate 20 scans per week, the cancer center was handling scans for 17 patients a day by 2007. The dramatic increase in scanning volume in the facility's PET/CT department has also increased the radiation dose in restricted and unrestricted areas of the facility, according to Talbot, former director of clinical PET/CT operations at the University of Pittsburgh Medical Center (UPMC).

**Francis Talbot, M.B.A., C.N.M.T.**
University of Pittsburgh Medical Center

To offset the impact of radiation exposure, staff at Hillman installed two modular, lead-lined shielding enclosures in the uptake room where two PET/CT patients are treated at the same time. Patients rest for an hour in that room to allow uptake after being injected with 18-FDG, Talbot said.

Talbot said the modular shielding, which resembles an office cubicle, is also equipped with a lead ceiling to protect staff on the floor above the room. The shields were custom-made for Hillman by Milwaukee-based Vulcan Global Manufacturing Solutions based on a UPMC design.

Talbot and colleagues added the dosimetry reports for all technologists assigned to the PET/CT scanner for a six-month period prior to the equipment's installation and divided that sum by the number of patients scanned during that time period to determine the radiation dose contribution per patient before shielding. Researchers followed the same process in computing data for the six-month period after installation.

Results showed that before the lead shields were added to the uptake room, radiation exposure to a technologist was 2.66 milliRoentgen (mR) per patient. After the modular shields were added, exposure dropped to 2.23 mR per patient, for a decrease of 15 percent.

Although the shields were installed primarily as a means of reducing radiation exposure to the floor above, Talbot says it also lowered exposure to the technologists performing the studies.

**Learn More**

Abstracts for studies presented at RSNA 2008 are available online.

- **"Walking While Working: A Demonstration of a Treadmill-based Radiologist Workstation"**
  *RSNA2008.RSNA.org/event_display.cfm?em_id=6011404*
- **"The Effect of Modular Lead Shields on Occupational Radiation Exposure in a Busy Clinical PET/CT Department"**
  *RSNA2008.RSNA.org/event_display.cfm?em_id=6005373*

■ Note: These articles were adapted from stories that appeared in the RSNA 2008 *Daily Bulletin.* Daily newspapers from the annual meeting are available online at *RSNA.org/bulletin.*

Daily Bulletin