

Computed radiography (CR) provides an inexpensive and easy-to-implement technology for digital imaging. Our institution recently acquired an ACR-2000 (Lumisys, CA, USA) CR system that can be used for acquiring both simulation and portal digital images. We will describe our initial experience using the system.

Acceptance testing was done according to the vendor's procedures. In simulator mode, the system was assessed for uniformity, linearity of plate response with exposure, spatial resolution, contrast resolution, laser beam function and geometrical accuracy. In addition, we have developed quality assurance tests for spatial resolution, contrast, and linearity of response of the portal imaging mode using the commercially available QC-3V phantom (Masthead Imaging Corporation, BC, Canada) and Las Vegas phantom (Varian Associates, CA, USA). Simulation and portal images of patients for a variety of treatment sites were found to be of high quality, although the presence of dust in the system can degrade image quality.

Since two advantages of CR for portal imaging are the linearity of dose response and high spatial resolution, we have investigated the use of the system for verification of IMRT treatments. In one prostate IMRT patient, images of two fields were acquired for five treatments. Image registration and subtraction enabled verification of the consistency of the transmitted fluence, and comparison with the planned fluence map. In addition, gold seeds implanted into the prostate are visible in the images, enabling tracking of prostate position relative to the IMRT fields. The system therefore is a potential tool for verification of IMRT.