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**Preliminary evaluation of the QcKv-1 phantom and CyberKnife® digital flat panel detector (FPD) imager response**

**Purpose:** To evaluate the applicability of the QcKv-1 phantom (Standard Imaging) for trending analysis of the FPD imagers of CyberKnife® Robotic Radiosurgery System (Accuray Incorporated) and to study their response over a period of time and under different conditions. **Method and Materials:** Images of the QcKv-1 phantom were acquired on different CyberKnife systems over several months to study trends as well as reproducibility. X-ray settings like kVp were varied to simulate x-ray generator drift to see if this can be detected. These images were analyzed using Standard Imaging's PIPSpro software package to obtain the Relative Modulation Transfer Function (RTMF) and Contrast-to-Noise Ratio (CNR). **Results:** After performing the PIPSpro image analysis we obtained values for  $f_{30}$  and  $f_{50}$  ( $f_{50}$  is defined as the critical spatial frequency for which the response is 50% of the maximum RTMF) as well as CNR. Imaging tests of the CyberKnife FPDs show consistency over a period of several months. Changes in x-ray kVp show up in measured quantities like the RTMF and CNR. **Conclusion:** Although QcKv-1 was originally designed for FPD systems that are quite different from the CyberKnife imagers, its trending analysis can be a useful tool for early detection of imager issues. We are investigating the relationship between these low-level measurements and overall performance of the system, which is used for tracking tumors and patient motion rather than diagnostic radiology. This will require longer term monitoring and correlating these measurements with actual tracking performance.