

Advances in Screen/Film Radiography

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Purpose:

This presentation discusses recent advances in film/screen radiography. These include a high-resolution high-contrast film/screen system for mammography, as well as a high-speed high-resolution film/screen system that provides improved image quality and opportunities for dose reduction, compared to an existing state-of-the-art, general purpose film/screen system. A description of the technical aspects and system design of these new systems is given. The new film features novel silver-halide microcrystals and is dual coated using a split E-layer coating format featuring gradient crossover control. Without sacrificing image quality, the new system can be exposed with existing intensifying screens and provides significant dose reductions.

Methods:

This paper describes details of the system's design and performance. The film includes: 1) a dual-layer coating structure that provides high-speed and high-resolution imaging of chest and orthopedic imaging; 2) high sensitivity silver-halide microcrystals that provide high contrast and high resolution.

Modulation transfer function (MTF) measurements were used to describe the resolution of various film/screen combinations using this new radiographic film and they are compared to existing state-of-the-art film/screen systems.

Results:

Inverse square sensitometry and MTF measurements, as well as phantom and clinical radiographs using this new film/screen system, demonstrate several benefits. A significant dose reduction is possible without reducing image quality by using standard intensifying screens. In addition, significant image quality improvements are possible in orthopedic imaging using high-resolution extremity-intensifying screens at conventional radiation doses.

Conclusions:

We have designed, built, and implemented a novel film/screen system for general-purpose radiography that provides high-resolution images with a potential for dose reduction or MTF improvement. Initial clinical evaluation of the system demonstrates a 2X reduction in dose without sacrificing image quality. In addition, significant resolution improvements are possible at the conventional radiation doses.