AbstractID: 8801 Title: Experimental Evaluation of a New Ant-scatter Grid for Digital Radiographic Systems

Purpose:
Prototype anti-scatter grids, constructed specifically to optimize digital image quality for large patient anatomy, were evaluated. The primary and scatter transmission fractions and the quantum signal to noise ratio improvement factor (K_{SNR}) of the grids was measured.

Method and Materials:
The two new grids have line rates N=25 and 36 cm^{-1} and ratios r=21 and 15, respectively. The grids have fiber inter-space material and the lead septa of these grids are 5 mm tall. The primary and scatter x-ray transmission fractions were measured using a RQA8 beam type. The scatter transmission was measured using a 20 cm thick Solid Water^{TM} phantom and a graduated beam stop method. K_{SNR} was calculated for phantom thicknesses ranging from 10 to 50 cm using the measured transmission fractions and previously reported non-grid scatter to primary ratio values. Similar and previously reported measurements from other standard grids are included for comparative purposes.

Results:
The primary transmission fraction of the N25r21 and N36r15 grids were 0.64 and 0.69±0.01, respectively. The scatter transmission fractions were 0.056 and 0.059±0.002, respectively. The corresponding K_{SNR} values range from 1.37 for a 10 cm thick scatter phantom to 2.38 for 50 cm thick phantom. The reasonably good primary transmission and low scatter transmission properties of these grids combine to provide K_{SNR} values which are higher than any of the standard grids previously tested. Because there is more scatter to remove from the x-ray beam, the potential benefit of the grids improves as phantom thickness is increases.

Conclusion:
Physical evaluation of prototype grids with 5 mm tall lead septa indicates that they have the potential to improve the quality of digital radiographic images of large patient anatomy beyond that provided by standard grids.

Conflict of Interest (only if applicable):
Equipment provided by Smit Roentgen, The Netherlands.