

**Purpose:** To improve scatter control in abdominal radiography.

**Methods:** A crossed grid system was constructed and consists of a stationary low ratio, high strip density conventional grid (8:1, 60 lines/cm) positioned above and with its septa orthogonal to the septa of a novel high ratio, air interspace, coarse strip density scanning grid (15:1, 2.0 lines/cm). The latter has articulating grid slats; during an exposure the slats remain focused on the x-ray focal spot. To suppress grid line artifacts, a trapezoidal x-ray exposure was generated and coupled with the movement of the scanning grid. This effectively eliminates grid line artifacts for small grid movements. The grid DQE was measured for 4 grid configurations: the crossed grid system, the scanning grid alone, a stationary 15:1 conventional grid, and no grid. The measurements were made with standard CsI flat panel detector and a variety of acrylic thicknesses and x-ray tube potentials.

**Results:** In all cases the DQE<sub>grid</sub> measured with the various grid systems was markedly better (130% to 580%) than that measured without a grid. The performance of the crossed grid system was 6% to 120% better than the conventional 15:1 grid. The scanning grid system performed 22% better (20 cm acrylic, 60 kVp) to 6% worse (40 cm acrylic, 120 kVp) than the crossed grid system. While subtle gridline artifacts are present in flat-field images, the artifacts are invisible in images of anthropomorphic phantoms.

**Conclusions:** A high efficiency scanning grid system has been designed and constructed. The system requires only a short grid movement during an exposure to suppress grid line artifacts. It can be used with or without a crossed conventional low ratio grid. In either case, its dose efficiency in controlling scatter is markedly superior that of a high quality, high ratio conventional stationary grid.

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The authors are co-owners of X-Ray Imaging Innovations, which has developed this technology, and are co-inventors of U.S. Patent 6,795,529, which covers this technology