Cone-helical CT imaging using the 256-row (Cone Beam) CT Scanner

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We evaluated Feldkamp artifacts, which are specific to cone-beam CT, in phantom and clinical studies using the 256 multi-detector-row CT (256MDCT), and compared the reconstruction accuracy of axial and helical scans.

Image noise, slice sensitivity profile (SSP) and artifacts with the 256MDCT were evaluated using a phantom and the results were compared to those with a 64MDCT. We also examined chest and abdomen scans produced with the 256MDCT in volunteers.

For the axial scan, Feldkamp artifacts were visualized as high-frequency streak-like artifacts that are oriented horizontally at the edge of the scan region in the phantom study. Similar results were obtained with the volunteers in soft-tissue regions near either bony structures or air pockets. Feldkamp artifacts with the 256MDCT can lead to misdiagnosis if not correctly identified and minimized via helical scanning. Image noise was less for axial than helical scans, while SSP was better with helical than axial scans.

Feldkamp artifacts observed in the 256MDCT images, however, did not generally affect the interpretation of images. The 256MDCT promises more accurate diagnosis, and will provide volumetric cine images of wider cranio-caudal coverage, enabling new applications of CT.