

AbstractID: 4911 Title: Effects, detection and removal of zingers from scattered x-rays in CCD based cone beam CT

## **Purpose**

Zingers are tiny spurious white dots that appear randomly in CCD images. In order to improve the quality of CCD based cone beam CT technique, a new technique for the detection and removal of zingers is described and evaluated.

## **Method and Materials**

A bench top CCD based cone beam CT system was used to measure and investigate the presence of zingers. The cause and effects of zingers were studied. A new technique was developed to detect and correct the zingers. With this technique, the statistical behavior of pixel values in a projection image was first analyzed to identify candidates for zingers. Pixel values at the detected zinger locations were then compared in two consecutive projection views to eliminate false detections. To investigate and evaluate this technique, zingers were simulated by increasing the pixel values at randomly selected locations in projection data computed for a modified Shepp-Logan phantom. The simulated data were then detected and corrected for zingers and used for reconstruction. The resulting reconstructed image was compared with the image reconstructed from zinger free data and with images reconstructed from data corrected using three other zinger removal techniques.

## **Results**

Our measurement indicated that zingers may have resulted from scattered x-rays. They were found to generate visible artifacts and degrade the quality of reconstructed images. It was shown that zingers detection by comparing two identically acquired projections could be highly effective but impractical in CT imaging. Detection by comparing two consecutive projection views was equally effective but may be subject image blurring. Detection by analyzing signal fluctuations could result in a large number of faulty detections. The proposed new detection technique was found to be practical and effective without resulting in image blurring or faulty detections.

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