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## **A Preliminary Study of a New Concept Cone Beam CT System**

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Currently, research on cone beam CT, which is designed to acquire several sectional images of interested volume by a single rotation, is being actively progressed. Analogous to other conventional CT systems, cone beam CT obtain images by simultaneous motions of detector and x-ray tube, rotating same circular trajectory centered on the longitudinal axis of a body. In this research, a new concept on CT systems by which, detector and x-ray tube operates simultaneous but rotating in different path is suggested, and hence, the result of preliminary studies on image acquisition algorithm based on the new theory is considered to be proposed. The new CT system is composed of two gantries (One with x-ray tube rotation and the other with detector motion) and they are part from each other having more than some distance. The x-ray tube and detector, located on the opposite side of longitudinal axis, can acquire images by rotating in it's own gantry. This CT system can be said to have advantage of having ability to carry out various surgical operations using space between two gantries. In order to perform the image reconstruction for this new CT, filtered back projection algorithm, modified from the Feldcamp algorithm, have been used. This algorithm is classified into filtering and back projection steps. In this research, the potentialities were verified by using back projection. By reproducing the new CT system using computer, projection image on 3D Shepp-Logan phantom was obtained, and attempts were made to reconstruct the obtained image using back projection. As a result of back projection, an image with excess blurring could be acquired. Although objects in small size and having slight difference in electron density with the surroundings could not be seen accurately, general outline of an image was fairly be classified. By using this system, it is expected to acquire CT images easily without the movement of operating table during the surgery of a patient.

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