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Study of Body Surface Motion Effect using Sensor based Computer-Controlled Motion Phantom (SBMP) and Sensors: US, IR and Tilt Sensors

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This study aims to obtain body surface motion by using a sensor based computer-controlled motion phantom (SBMP) and sensors (US, IR, Tilt), and to develop respiration gating techniques that can adjust patients' beds by using reversed values of the data obtained. The SBMP made to measure body surface motion is composed of a BS II microprocessor, sensors, host computer and stepping motor etc. And the program to control and operate it was developed. After the SBMP was adjusted by entering random movement data, and the phantom movements were acquired using the sensors, the two data were compared and analyzed. And then, after the movements by respiration were acquired by using a cat, the real-time respiration gating techniques were drawn by operating the phantom with the reversed values of the data. The result of analyzing the acquisition-correction delay time for the data value shows that the data value coincided within 1% and that the acquisition-correction delay time was obtained real-time (2.34×10^{-4} sec). This study successfully confirms the clinical application possibility of respiration gating techniques by using a SBMP and sensors.

Keywords : Sensor based Computer-Controlled Motion Phantom (SBMP), Respiration Gating Radiotherapy Technique, Body Surface Motion