AbstractID: 9362 Title: Dosimetric Characterization of a Cone Beam O-arm Imaging System

Purpose: The O-arm is a cone beam imaging system designed primarily to support orthopedic surgery as well as for image-guided and vascular surgery. Using a gantry that can be opened or closed, the O-arm can function as a 2D fluoroscopy device or collect 3D volumetric imaging data like a CT system. Our clinical applications of the O-arm in spine surgical procedures, assessment of pedicle screw position, kyphoplasty procedures, and etc show that the O-arm 3D mode provides enhanced imaging information in the surgical procedure compared to radiographs or fluoroscopy alone. However, the radiation dose of the O-arm has remained uninvestigated. This study is to investigate patient dose and scatter radiation from an O-arm and compare the results to those from a CT scanner and a conventional C-arm. **Method and Materials:** The patient dose was measured using a 0.6 cc Farmer ion chamber and 30 cm long CT head and body phantoms. Scatter radiation was measured at several locations around the O-arm, at 1m, 2m and 3m distances from the iso-center of the O-arm, in both the 2D fluoroscopic mode and the 3D mode with a Radcal 10x5-180 pancake ion chamber using a 30 cm long CTDI body phantom as the source of scatter. The same measurements were made for an OEC C-arm and a 64 slice CT scanner, respectively. **Results:** The results show that under identical technical conditions and with the same scan length, the O-arm 3D mode delivers radiation dose to patients and scatter dose to personnel that is comparable to that of the 64 slice CT scanner. The O-arm 2D mode produces similar scatter radiation as a conventional GE OEC fluoroscopic C-arm system. **Conclusion:** Our study demonstrated that the O-arm had comparable radiation dose to patients and radiologists as CT and C-arm systems.