

ASSESSMENT OF EFFECTIVE RADIATION DOSE OF AN EXTREMITY CBCT, MSCT AND CONVENTIONAL X RAY FOR KNEE AREA USING MOSFET DOSEMETERS

1. Juha Koivisto^{1,*},
2. Timo Kiljunen²,
3. Jan Wolff^{3,4} and
4. Mika Kortenesniemi⁵

± Author Affiliations

1. ¹Department of Physics, University of Helsinki, Gustaf Hällströmin katu 2a, FI-00560 Helsinki, Finland
2. ²Docrates Cancer Hospital, Saukonpaadenranta 2, FI-00180 Helsinki, Finland
3. ³Oral and Maxillofacial Unit Department of Ortholaryngology, P.O. Box 2000, University of Tampere, FI-33521 Tampere, Finland
4. ⁴Department of Radiology, Medical Imaging Center, Tampere University Hospital, Tampere, Finland
5. ⁵HUS Helsinki Medical Imaging Center, University of Helsinki, Haartmaninkatu 4 (POB 340), Helsinki, FI-00029 HUS, Finland

1.  Corresponding author: juha.koivisto@planmeca.com

Received January 31, 2013.
Revision received May 27, 2013.
Accepted May 31, 2013.

Abstract

The objective of this study was to assess and compare the organ and effective doses in the knee area resulting from different commercially available multislice computed tomography devices (MSCT), one cone beam computed tomography device (CBCT) and one conventional X-ray radiography device using MOSFET dosimeters and an anthropomorphic RANDO knee phantom. Measurements of the MSCT devices resulted in effective doses ranging between 27 and 48 μSv . The CBCT measurements resulted in an effective dose of 12.6 μSv . The effective doses attained using the conventional radiography device were 1.8 μSv for lateral and 1.2 μSv for anterior-posterior projections. The effective dose resulting from conventional radiography was considerably lower than those recorded for the CBCT and MSCT devices. The MSCT effective dose results were two to four times higher than those measured on the CBCT device. This study demonstrates that CBCT can be regarded as a potential low-dose 3D imaging technique for knee examinations.