

การวัดปริมาณรังสีสมมูลเลนส์ตาในเนื้อเยื่อจำลองโดยใช้อุปกรณ์วัดปริมาณรังสีโอเอสแอล

Measurements of Eye Lens Doses in Phantom Using
Optically Stimulated Luminescence (OSL) Dosimeter

ช่วงเวลาดำเนินการ ปี พ.ศ. 2560

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รายละเอียดสรุป

Background and Objective: Intervention radiology is one of the medical procedure that induce a risk from x-ray ionizing radiation. The risk includes biological effect to eye lens, for example, lens opacities and cataract. The purpose of this study was to measure the eye lens doses in phantom using optically stimulated luminescence (nanoDot). The efficiency of OSL and the calculated personal dose equivalent for eye lens ($H_p(3)$) were simulated and performed using cylindrical phantom.

Methods: OSL nanoDot were placed on the phantom and irradiated with the x-ray energy of 33, 47, and 65 keV. The simulation of eye lens doses of occupational radiation workers in case of wearing and not wearing lead glasses were calculated at the doses of 500, 1000, and 2000 mSv.

Results: The results showed that the accuracy of OSL was 0.11% to 5.84%. The calculated $H_p(3)$ was linearly related to delivered doses ($R^2 > 0.99$). The $H_p(3)$ decreased when the distance between the eye lens and radiation source was increased. With the radiation protection glasses, the occupational radiation dose was reduced from 103 to 1012 times compare to without lead glasses.

Conclusions: The position and the angle of eye lens against the radiation source and lead absorption energies of X-ray affect to $H_p(3)$. The $H_p(3)$ was significantly reduced when wearing the lead glasses which help to reduce the risk of opacities and cataract.

