

Purpose: The exposure index (EI) value is recommended by international agencies as a method of monitoring radiation dose in computed radiography (CR), however the clinical use and impact has not been fully addressed in the literature. This study investigates EI response in common clinical circumstances, namely processing delay, EI consistency and optimization using various manufacturers.

Methods: Anthropomorphic phantoms and human cadavers were used to assess EI relationships outlined. A range of manufacturers and common clinical examinations were included. For each examination, positioning and exposure parameters were in accordance with international guidelines. Various EI values and entrance surface doses (ESD) were measured. Image quality was assessed by experienced clinicians using anatomical criteria judged against a reference image. Visualization of common abnormalities was analyzed to establish diagnostic efficacy.

Results: The EI value decreased considerably with increased processing delay. EI values decreased by 100 within 25 minutes delay for examinations using 1 manufacturer. Within 1 hour delay, the EI value decrease represented more than a third less of detector exposure. Regarding consistency, the EI values remained constant throughout with DR, however substantial fluctuations were noted for all examinations and manufacturers in CR. Variance in EI response with different imaging plates was noted. Manufacturers target EIs from a patient dose and image quality perspective was investigated. From manufacturers targets, a significant reduction in ESD of up to 38% was noted, in line with optimum image quality. Initial pathological analysis suggests that diagnostic efficacy at lower EI values is projection specific.

Conclusion: Clarification of EIs as an effective dose monitoring tool requires investigation across manufacturers. EI reliability as a feedback mechanism for technicians in CR is questioned.