



## CORR Insights

**CORR Insights®: A Radiation Safety Training Program Results in Reduced Radiation Exposure for Orthopaedic Residents Using the Mini C-arm**

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**Where Are We Now?**

**I**n their retrospective comparative study, Gendelberg et al. shed light on a key topic with ties to

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resident education, patient safety, and quality of care in orthopaedic surgery: Radiation safety. Although it is possible to rely on radiologists and radiology technologists, an understanding of methods that limit unnecessary radiation exposure to patients and staff should be of the utmost importance to the orthopaedic surgeons who frequently direct its use. This is even more important in settings such as the emergency room where fluoroscopy is frequently used for fracture reductions but the assistance of a radiology technologist is often not available. While it is known that interventions such as lead shielding, patient positioning, beam collimation, limiting magnification, and increasing distance between the radiation source and nonessential personnel all help limit unnecessary radiation,

[5, 6] recent research has shown striking variation in use [8], awareness [12], and attitudes [9] about diagnostic radiation in orthopaedic surgery.

Despite several of these studies' recommendations for educating orthopaedic surgeons to standardize and minimize fluoroscopy use, few reports to date have evaluated specific interventions in the clinical setting. One study by Baumgartner et al. [2] assessed the use of real-time dosimetry to inform users of exposure levels, and Bar-On et al. [1] evaluated a complement of lectures, preoperative briefings, and visual cues with a review of radiation exposure data at postoperative conferences. Both of these studies were set in the operating room with surgeons and technologists who had a variety of experience. Until this publication by Gendelberg et al., little was known about how reduction of unnecessary emergency room radiation exposure could be achieved by proper education of orthopaedic trainees.

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## Where Do We Need To Go?

Historical data from the Life Span Study cohort [10, 11] has elucidated the dose-response effect of radiation on several adverse health outcomes including malignancy; diagnostic medical imaging may also contribute to the development of these conditions [5]. Educating practitioners in the best practices and safe use of diagnostic radiology is therefore a vital component of patient care. Our colleagues in the American College of Radiology have already created initiatives in order to broadcast awareness to their membership and the public, including Image Wisely® (in adult medical imaging) [3] and Image Gently® (in pediatric medical imaging) [4, 7].

Despite this, there is no standardized orthopaedic curriculum of radiation safety particularly as it pertains to the use of fluoroscopy. Notwithstanding the self-identified limitations of the study by Gendelberg et al. including retrospective analysis, the potential for bias and noncomparability of experience between groups, and machine emission as a surrogate for subject exposure, the authors provide insight into this important aspect of residency training and begin to offer a tangible educational solution which may serve as a preliminary model to develop and refine a curriculum of resident education.

## How Do We Get There?

The logical next step in this line of research would be further investigation of the effect of resident education on reducing radiation exposure in the emergency room. This is of greater importance during pediatric fracture reduction, as children represent a particularly vulnerable patient population. Research methodology should be strengthened by employing a prospective study design and obtaining precise direct measurements of radiation exposure to patients and staff. While the exact educational content, format, and method of reinforcement may be debatable and an area of future research interest, it seems reasonable to begin pragmatic radiation safety training for all trainees now, specifically during those early formative years when practice habits and clinical techniques are being formed, reinforced, and passed on to junior residents.

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