



The Practice Standards for Medical Imaging and Radiation Therapy

Advisory Opinion Statement
Use of Post-Exposure Shuttering, Cropping and Electronic Masking in Radiography

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Use of Post-exposure Shuttering, Cropping and Electronic Masking in Radiography

After researching evidentiary documentation such as current literature, curriculum, position statements, scopes of practice, laws, federal and state regulations, and inquiries received by the American Society of Radiologic Technologists Governance Department, the American Society of Radiologic Technologists has issued the following opinions.

Accountability and Responsibility of Medical Imaging and Radiation Therapy

Professionals

The profession holds medical imaging and radiation therapy professionals responsible and accountable for rendering safe, effective clinical services to patients and for judgments exercised and actions taken in the course of providing those services.

Acts that are within the recognized scope of practice for a given license or certification may be performed only by those individuals who possess the education and skill proficiency to perform those acts in a safe and effective manner.

The medical imaging and radiation therapy professional's performance should be consistent with state and federal laws, established standards of practice, facility policies and procedures, and should be evidence-based.

Advisory Opinion

It is the opinion of the American Society of Radiologic Technologists that based upon current literature, curricula set forth by the ASRT, certification examination specifications by the American Registry of Radiologic Technologists, and recommendations by the American College of Radiology that:

1. It is within the scope of practice of a radiologic technologist to determine and apply appropriate pre-exposure collimation to individual projections of exams to comply with the principle of as low as reasonably achievable (ALARA). Post-exposure shuttering, cropping, electronic collimation or electronic masking to eliminate the visibility of large regions of brightness are acceptable, where automatic processing fails to do so.
2. It is outside of the scope of practice of a radiologic technologist to use post-exposure shuttering, cropping, electronic collimation or electronic masking to eliminate any anatomical information. This information is a part of the patient's permanent medical record, and should therefore be presented to the licensed practitioner to determine whether the exposed anatomy obtained on any image is significant or of diagnostic value.
3. It is outside the scope of practice of a radiologic technologist to use post-exposure shuttering, cropping, electronic collimation or electronic masking to duplicate and use any acquired image for more than one prescribed view or projection on any exam. Facilities acquiring digital images are legally required to retain information in the Digital Imaging and Communications in Medicine (DICOM) information of each image that identifies the selected view or projection at the time of image acquisition. Using the same

acquired image to represent two different prescribed views or projections is a falsification of the information in the patient medical record and imaging study made available to the licensed practitioner.

GRADE: Strong

Rationale

The ASRT determines the Practice Standards and scopes of practice for medical imaging and radiation therapy professionals. The practice standards' general stipulation emphasizes the importance of an individual being educationally prepared and clinically competent to practice in the profession of medical imaging and radiation therapy.

Definitions

Cropping: the process of selecting and removing a portion of the image.

Electronic masking: electronic collimation or cropping of the digital radiographic image that occurs during postprocessing of the acquired image and does not alter the size of the irradiated field.

Processing: manipulation of the raw data just after acquisition.

Shuttering: a post processing technique that may be used to eliminate ambient light around an image for the sole purpose of improving the quality of the displayed image. It should not be used as a substitute for insufficient collimation of the irradiated field.

Evidentiary Documentation:

Current Literature

Borner, Wiersma-Deijl, and Holsscher. Electronic collimation and radiation protection in paediatric digital radiography revival of the silver lining. *Insights Imaging*. Oct 2013 4(5):723-727)

Herrmann et al. Best Practices in Digital Radiography. **ASRT white paper.**

http://www.asrt.org/docs/default-source/whitepapers/asrt14_bstpracdigradwhp_319ffdd00c826490b755ff0000d82291.pdf?sfvrsn=0 2012.

Fauber, Terri L. Radiographic Imaging and Exposure 5th Ed. Elsevier. 2016.

Lo and Puchalski. Digital Image Processing. *Veterinary Radiology and Ultrasound*. 2008.

Chalazonitis et al. How to Optimize Radiological Images Captured from Digital Cameras, Using the Adobe Photoshop 6.0 Program. *Journal of Digital Imaging*. June 2003 16(2) 216-229. Pub online 11 Sept 2003.

American College of Radiology. *ACR-AAPM-SIIM- Practice Parameter for Digital Radiography*. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/rad-digital.pdf> 2017.

Carroll, Quinn B. *Radiography in the Digital Age*. Charles C Thomas, 2nd Ed., 2014.

Seeram, Euclid. *Digital Radiography: An Introduction*. Delmar, Cengage Learning, 2011.

Carter, Christi, and Beth Vealé. *Digital radiography and PACS*. Elsevier Health Sciences, 2nd Ed., 2014.

Willis, C. E. (2009). Optimizing digital radiography of children. *European Journal of Radiology*, 72(2), 266–273. doi:http://dx.doi.org/10.1016/j.ejrad.2009.03.003

Uffmann, M., & Schaefer-Prokop, C. (2009). Digital radiography: the balance between image quality and required radiation dose. *European Journal of Radiology*, 72(2), 202–8. doi:10.1016/j.ejrad.2009.05.060

Russell, Jordan, et al. "Adult fingers visualized on neonatal intensive care unit chest radiographs: what you don't see." *Canadian Association of Radiologists Journal* 64.3 (2013): 236-239.

Don, Steven, et al. "Image Gently campaign back to basics initiative: ten steps to help manage radiation dose in pediatric digital radiography." *American Journal of Roentgenology* 200.5 (2013): W431-W436.

Zetterberg, L. G., and A. Espeland. "Lumbar spine radiography—poor collimation practices after implementation of digital technology." (2014)

Fauber, Terri L., and Melanie C. Dempsey. "X-ray Field Size and Patient Dosimetry." *Radiologic Technology* 85.2 (2013): 155-161.

Goske, Marilyn J., et al. "Image Gently: challenges for radiologic technologists when performing digital radiography in children." *Pediatric Radiology* 41.5 (2011): 611-619. (Quality of Evidence: High)

Curriculum

Not applicable

(Quality of Evidence: Not Applicable)

ASRT Practice Standards for Medical Imaging and Radiation Therapy, all practice standards documents.

Scope of Practice:

Applying principles of ALARA to minimize exposure to patient, self and others

ASRT Practice Standards for Medical Imaging and Radiation Therapy, Radiography and Limited X-ray Machine Operator Practice Standards (2017)

Clinical Performance Standard Two-Analysis/Determination

Optimizing technical factors in accordance with the principles of ALARA.

Verifies that exposure indicator data for digital radiographic systems has not been altered or modified and is included in the Digital Imaging Communications in Medicine (DICOM) header and on images exported to media.

Analyzes digital images to determine the use of appropriate imaging parameters.

Clinical Performance Standard Four-Performance

Positions patient for anatomic area of interest, respecting patient ability and comfort.

Employs proper radiation safety practices.

Optimizes technical factors according to equipment specifications to meet the ALARA principle.

Uses pre-exposure collimation and proper field-of-view selection.

Selects the best position for the demonstration of anatomy (*Radiography only*).

Clinical Performance Standard Five-Evaluation

Evaluates images for positioning to demonstrate the anatomy of interest (*Radiography only*).

Evaluates images for optimal technical exposure factors (*Radiography only*).

Reviews images to determine if additional images will enhance the diagnostic value of the procedure (*Radiography only*).

Evaluates images for overall image quality of a specific area of anatomical interest based on limited education, training and licensure/certification within his or her scope of practice (*Limited X-ray Machine Operator only*).

Recognizes the need to adjust patient position or technical exposure factors to improve the quality of the procedure (*Limited X-ray Machine Operator only*).

Clinical Performance Standard Six-Implementation

Performs additional images that will produce the expected outcomes based upon patient condition and procedural variances (*Radiography only*).

Performs additional images that will produce the expected outcome based on patient's condition and procedural variance under the direction of a licensed practitioner or radiographer (*Limited X-ray Machine Operator only*).

Professional Performance Standard Five – Ethics

Adheres to the established practice standards of the profession.

(Quality of Evidence: High)

Federal and State Statute Reference(s)

Not applicable

(Quality of Evidence: Not applicable)

Determining Scope of Practice

Each medical imaging and radiation therapy professional must exercise professional and prudent judgment when determining whether the performance of a given act is within the scope of practice for which the medical imaging and radiation therapy professional is licensed, if applicable within the jurisdiction in which he/she is employed, educationally prepared and clinically competent to perform.

The ASRT issues advisory opinions as to what constitutes appropriate practice. As such, an opinion is not a regulation or statute and does not have the force and effect of law. It is issued as a guidepost to medical imaging and radiation therapy professionals who engage in safe practice. Federal and state laws, accreditation standards necessary to participate in government programs, and institutional policies and procedures supersede these standards. The individual must be educationally prepared and clinically competent as a prerequisite to professional practice.

Approved: June 28, 2015

Adopted, Main Motion, C-15.23, 2015

Amended, Main Motion, C-18.10, 2018

ASRT House of Delegates

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