ACR–SPR–SSR PRACTICE PARAMETER FOR THE PERFORMANCE OF RADIOGRAPHY OF THE EXTREMITIES

The American College of Radiology, with more than 40,000 members, is the principal organization of radiologists, radiation oncologists, and clinical medical physicists in the United States. The College is a nonprofit professional society whose primary purposes are to advance the science of radiology, improve radiologic services to the patient, study the socioeconomic aspects of the practice of radiology, and encourage continuing education for radiologists, radiation oncologists, medical physicists, and persons practicing in allied professional fields.

The American College of Radiology will periodically define new practice parameters and technical standards for radiologic practice to help advance the science of radiology and to improve the quality of service to patients throughout the United States. Existing practice parameters and technical standards will be reviewed for revision or renewal, as appropriate, on their fifth anniversary or sooner, if indicated.

Each practice parameter and technical standard, representing a policy statement by the College, has undergone a thorough consensus process in which it has been subjected to extensive review and approval. The practice parameters and technical standards recognize that the safe and effective use of diagnostic and therapeutic radiology requires specific training, skills, and techniques, as described in each document. Reproduction or modification of the published practice parameter and technical standard by those entities not providing these services is not authorized.

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care[1]. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner considering all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by variables such as the condition of the patient, limitations of available resources, or advances in knowledge or technology after publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document may consider documenting in the patient record information sufficient to explain the approach taken.

The practice of medicine involves the science, and the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The purpose of this document is to assist practitioners in achieving this objective.

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1 *Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, 831 N.W.2d 826 (Iowa 2013) Iowa Supreme Court refuses to find that the "ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (Revised 2008)" sets a national standard for who may perform fluoroscopic procedures in light of the standard's stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarver, 63 P.3d 1076 (Ariz. App. 2003) where in a concurring opinion the Court stated that "published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation" even though ACR standards themselves do not establish the standard of care.*

I. INTRODUCTION

This practice parameter was revised by the American College of Radiology (ACR) in collaboration with the Society for Pediatric Radiology (SPR) and the Society of Skeletal Radiology (SSR).

Radiography is an imaging technique for the evaluation of the bones, joints, and soft tissues of the extremities. It should be performed for valid medical reasons, using the minimum radiation dose necessary to obtain a diagnostic-quality examination. It is often the first study to be performed for evaluating pathology of the extremities, and additional specialized examinations may be required to complete the evaluation.

This practice parameter provides recommendations for performing extremity radiography and should be applied in accordance with the ACR–AAPM–SIIM-SPR Practice Parameter for Digital Radiography [1].

II. INDICATIONS

Indications for radiography of the extremities include, but are not limited to:

1. Trauma
2. Pain
3. Instability
4. Impingement
5. Known and suspected physical abuse, such as in infants and young children (see the ACR–SPR Practice Parameter for Skeletal Surveys in Children [2,3])
6. Metabolic diseases, nutritional deficiencies, and skeletal changes from systemic disease
7. Benign and malignant neoplasms
8. Primary nonneoplastic bone pathology
9. Arthropathy
10. Infection
11. Preoperative or postoperative evaluation and/or follow-up
12. Congenital syndromes and developmental disorders
13. Vascular lesions
14. Evaluation of soft tissues in an extremity (eg, suspected foreign body)
15. Correlation of abnormal skeletal findings on other imaging studies
16. Evaluation of spinal and extremity alignment
17. For comparison with opposite side
18. Evaluation of limb lengths

III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the ACR–AAPM–SIIM-SPR Practice Parameter for Digital Radiography [1].

IV. SPECIFICATIONS OF THE EXAMINATION

A. The written or electronic request for a radiograph of the extremities should provide sufficient information to demonstrate the medical necessity of the examination and allow for its proper performance and interpretation.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). Additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or other appropriately licensed health care provider familiar with the patient's clinical problem or question and consistent with the state scope of practice requirements. (ACR Resolution 35, adopted in 2006 – revised in 2016, Resolution 12-b)

All facilities should have protocols for standard images of each anatomic area, including appropriate positioning, centering, and beam collimation for all extremity imaging. These protocols should be designed to optimize diagnostic information while minimizing radiation exposure.

For the pregnant or potentially pregnant patient, see the ACR–SPR Practice Parameter for Imaging Pregnant or Potentially Pregnant Patients with Ionizing Radiation [4].

A.

The following table lists the minimum recommended views in routine circumstances. In many instances, there is little or no scientific evidence in the literature to determine which views constitute the minimum requirement; thus, the recommendations in those instances reflect the opinions of the authors supported by expert opinion in the literature.

A.

The number and types of views may be modified for any given clinical situation. Additional views may be warranted as part of the initial examination, or after review of the initial images, to clarify suspected pathology. Certain clinical situations may require more views than the minimum for a given anatomic area. Furthermore, additional imaging examinations may be indicated based on the evaluation of the images. For example, when toddler fracture is a concern, an oblique view of the tibia may be helpful in demonstrating an occult fracture not visible on the routine anteroposterior (AP) and lateral views. Conversely, it should be understood that this list of minimum views is not an absolute dictum; in certain clinical scenarios, radiologists and nonradiologist clinicians may rely on their knowledge and experience to further limit the necessary views. For example, in skeletal surveys for systemic disease, AP views are often sufficient. Weight-bearing radiographs should be considered, if feasible, when imaging weight-bearing joints such as feet, ankles, knees, and hips.

Table 1: Minimum Recommended Routine Views

Anatomic Area	Views
Scapula	Anteroposterior (AP) and lateral [5]
Clavicle	AP and AP angulated view [6]
Acromioclavicular (AC) joint	Upright AP and outlet (lateral) view collimated to the AC joint [7]
Shoulder	Two views, one of which should be AP or Grashey, and additional views (such as scapular Y, axillary, Velpeau) as indicated by clinical circumstances [8,9]
Humerus	AP and lateral [5,10]
Elbow	AP and lateral [11,12]

Forearm	AP and lateral [11]
Wrist	Posteroanterior (PA), oblique, and lateral [13-15]
Hand	PA, oblique, and lateral [14,15]
Hand bone age	PA, left hand and wrist [16]
Fingers	PA, oblique, and lateral [14,15]
Anatomic Area	Views
Hip	AP of affected hip OR of pelvis and lateral (method dependent upon clinical scenario) [17-20]
Pelvis	AP [21]
Femur	AP and lateral [19,22]
Patella	Lateral and patellar/axial [23]
Knee	AP and lateral (cross-table lateral recommended for trauma patients) [24-27]
Tibia-fibula	AP and lateral [22,28]
Ankle	AP, oblique (mortise), and lateral [15,22,29,30]
Calcaneus	Lateral and axial [31]
Foot	AP, oblique, and lateral [15,32]
Toes	AP, oblique, and lateral [[15]

B. Specific Considerations for the Pediatric Patient

1. A grid should not be used for extremity radiography in the infant and small child.
2. The kVp and mAs technique charts should be individualized according to patient size and age.
3. All efforts should be made to minimize radiation exposure to the health care workers and family members involved in patient positioning and immobilization.
4. Metabolic survey imaging of the child should include at least one posteroanterior (PA) view of the wrist and an AP view of the knee.

5. When imaging a symptomatic bone or joint, routine comparison images of the corresponding contralateral bone or joint generally are not indicated; however, limited comparison views may be helpful to verify or exclude pathology after initial review of the symptomatic extremity in some children [33].
6. Leg-length discrepancy should be assessed with a full-length standing projection, either with a pencil-beam type unit that causes no distortion or magnification or using AP radiograph of the lower extremities (teleoroentgenogram), ideally with use of a magnification marker/ruler or three distinct exposures centered over the hip, knee, and ankle (scanogram or orthoroentgenogram) [34]. For evaluation of the mechanical axis, the patella should be centered between the femoral condyles
7. Certain pathologic processes may warrant simultaneous evaluation of both the right and left sides

C. Collimating the x-ray field to the area of interest is most effective in reducing scatter radiation outside the field of view (FOV). The use of pelvic/gonadal shielding, historically offered to patients to reassure them, has been shown to potentially increase internal scatter and therefore radiation dose to the pelvis. In the past, use of shielding was optional but not required. In light of new data, the use of protective shielding for the pelvis when it is outside the field of view is not recommended, including in pregnant patients. [35]. Incorrect placement of gonadal shields can obscure pathology and increase the need for repeat images [35]. Also, placement of gonadal shields in girls may not effectively shield the ovaries [36]. Substantial guidance on gonadal shielding is available in NCRP Statement No. 13 and its supplemental material [35].

V. DOCUMENTATION

Reporting should be in accordance with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings [38].

VI. EQUIPMENT SPECIFICATIONS

See the ACR–AAPM–SIIM-SPR Practice Parameter for Digital Radiography [1].

Equipment performance monitoring should be in accordance with the ACR–AAPM Technical Standard for Diagnostic Medical Physics Performance Monitoring of Radiographic Equipment [39].

VII. RADIATION SAFETY IN IMAGING

Radiologists, medical physicists, non-physician radiology providers**,** radiologic technologists, and all supervising physicians have a responsibility for safety in the workplace by keeping radiation exposure to staff, and to society as a whole, "as low as reasonably achievable" (ALARA) and to assure that radiation doses to individual patients are appropriate, taking into account the possible risk from radiation exposure and the diagnostic image quality necessary to achieve the clinical objective. All personnel who work with ionizing radiation must understand the key principles of occupational and public radiation protection (justification, optimization of protection, application of dose constraints and limits) and the principles of proper management of radiation dose to patients (justification, optimization including the use of dose reference levels). https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1775_web.pdf

Nationally developed guidelines, such as the ACR's Appropriateness Criteria®, should be used to help choose the most appropriate imaging procedures to prevent unnecessary radiation exposure.

Facilities should have and adhere to policies and procedures that require ionizing radiation examination protocols (radiography, fluoroscopy, interventional radiology, CT) to vary according to diagnostic requirements and patient body habitus to optimize the relationship between appropriate radiation dose and adequate image quality. Automated dose reduction technologies available on imaging equipment should be used, except when inappropriate for a specific exam. If such technology is not available, appropriate manual techniques should be used.

Additional information regarding patient radiation safety in imaging is available from the following websites – Image Gently® for children (www.imagegently.org) and Image Wisely® for adults (www.imagewisely.org). These advocacy and awareness campaigns provide free educational materials for all stakeholders involved in imaging (patients, technologists, referring providers, medical physicists, and radiologists).

Radiation exposures or other dose indices should be periodically measured by a Qualified Medical Physicist in accordance with the applicable ACR Technical Standards. Monitoring or regular review of dose indices from patient imaging should be performed by comparing the facility's dose information with national benchmarks, such as the ACR Dose Index Registry and relevant publications relying on its data, applicable ACR Practice Parameters, NCRP Report No. 172, Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States or the Conference of Radiation Control Program Director's National Evaluation of X-ray Trends; 2006, 2009, amended 2013, revised 2023 (Res. 2d).

VIII. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control, and Patient Education appearing under the heading *Position Statement on QC & Improvement, Safety, Infection Control*, *and Patient Educ*ation on the ACR website (https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Quality-Control-and-Improvement).

ACKNOWLEDGEMENTS

This guideline was revised according to the process described under the heading *The Process for Developing ACR Practice Guidelines and Technical Standards* on the ACR website (https://www.acr.org/Clinical-Resources/Practice-Parameters-and-Technical-Standards), by the Committee on Body Imaging (Musculoskeletal) of the ACR Commission on Body Imaging, Committee on Practice Parameters – General, Small, Emergency and/or Rural Practice of the ACR Commission on the General, Small, Emergency and/or Rural Practice, and the Committee on Practice Parameters – Pediatric Radiology in collaboration with the SPR and the SSR.

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REFERENCES

1. American College of Radiology. ACR–AAPM–SIIM-SPR Practice Parameter for Digital Radiography. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Rad-Digital.pdf. Accessed May 2, 2022.
2. American College of Radiology. ACR–SPR Practice Parameter for the Performance and Interpretation for Skeletal Surveys in Children. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Skeletal-Survey.pdf. Accessed May 2, 2022.
3. Flaherty EG, Perez-Rossello JM, Levine MA, et al. Evaluating children with fractures for child physical abuse. Pediatrics 2014;133:e477-89.
4. American College of Radiology. ACR–SPR Practice Parameter for Imaging Pregnant or Potentially Pregnant Patients with Ionizing Radiation. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Pregnant-Pts.pdf. Accessed May 2, 2022.
5. Ridpath CA, Wilson AJ. Shoulder and humerus trauma. Seminars in musculoskeletal radiology 2000;4:151-70.
6. Linnau KF, Blackmore CC. Bony injuries of the shoulder. Current problems in diagnostic radiology 2002;31:29-47.
7. Nguyen V, Williams G, Rockwood C. Radiography of acromioclavicular dislocation and associated injuries. Critical reviews in diagnostic imaging 1991;32:191-228.
8. Goud A, Segal D, Hedayati P, Pan JJ, Weissman BN. Radiographic evaluation of the shoulder. European journal of radiology 2008;68:2-15.
9. Robinson BC, Athwal GS, Sanchez-Sotelo J, Rispoli DM. Classification and imaging of proximal humerus fractures. The Orthopedic clinics of North America 2008;39:393-403, v.
10. Sanders TG, Jersey SL. Conventional radiography of the shoulder. Seminars in roentgenology 2005;40:207-22.
11. Allen SD, Harvey C, O'Regan D. Interpretation of elbow and forearm radiographs. Br J Hosp Med (Lond) 2005;66:M50-3.
12. Miller TT. Imaging of elbow disorders. The Orthopedic clinics of North America 1999;30:21-36.
13. Kuschner SH, Lane CS. Evaluation of the painful wrist. Am J Orthop (Belle Mead NJ) 1997;26:95-102.
14. Stein F. Radiographic examination of the hand and wrist. Emergency medicine clinics of North America 1985;3:221-33.
15. De Smet AA, Doherty MP, Norris MA, Hollister MC, Smith DL. Are oblique views needed for trauma radiography of the distal extremities? AJR. American journal of roentgenology 1999;172:1561-5.
16. Greulich WW, Pyle SI. *Radiographic Atlas of Skeletal Development of the Hand and Wrist.* 2nd ed. Stanford, CA: Stanford University Press; 1999.

17. Erb RE. Current concepts in imaging the adult hip. Clinics in sports medicine 2001;20:661-96.
18. Loder RT, Aronsson DD, Weinstein SL, Breur GJ, Ganz R, Leunig M. Slipped capital femoral epiphysis. Instructional course lectures 2008;57:473-98.
19. Norris MA, De Smet AA. Fractures and dislocations of the hip and femur. Seminars in roentgenology 1994;29:100-12.
20. Tannast M, Siebenrock KA, Anderson SE. Femoroacetabular impingement: radiographic diagnosis--what the radiologist should know. AJR. American journal of roentgenology 2007;188:1540-52.
21. Hayes CW, Balkissoon AR. Current concepts in imaging of the pelvis and hip. The Orthopedic clinics of North America 1997;28:617-42.
22. Flynn JM, Widmann RF. The limping child: evaluation and diagnosis. The Journal of the American Academy of Orthopaedic Surgeons 2001;9:89-98.
23. Ghelman B, Hodge JC. Imaging of the patellofemoral joint. The Orthopedic clinics of North America 1992;23:523-43.
24. Buckland-Wright C. Which radiographic techniques should we use for research and clinical practice? Best practice & research. Clinical rheumatology 2006;20:39-55.
25. Cockshott WP, Racoveanu NT, Burrows DA, Ferrier M. Use of radiographic projections of knee. Skeletal radiology 1985;13:131-3.
26. Gray SD, Kaplan PA, Dussault RG, et al. Acute knee trauma: how many plain film views are necessary for the initial examination? Skeletal radiology 1997;26:298-302.
27. Lee JH, Weissman BN, Nikpoor N, Aliabadi P, Sosman JL. Lipohemarthrosis of the knee: a review of recent experiences. Radiology 1989;173:189-91.
28. Rogers LR. The knee and shafts of the tibia and fibula. In: Rogers LR, ed. *Radiology of Skeletal Trauma*. 2nd ed. New York: Churchill Livingston; 1992:1199-317.
29. Brandser EA, Berbaum KS, Dorfman DD, et al. Contribution of individual projections alone and in combination for radiographic detection of ankle fractures. AJR. American journal of roentgenology 2000;174:1691-7.
30. Smith SE, Chang EY, Ha AS, et al. ACR Appropriateness Criteria® Acute Trauma to the Ankle. J Am Coll Radiol 2020;17:S355-s66.
31. Matherne TH, Tivorsak T, Monu JU. Calcaneal fractures: what the surgeon needs to know. Current problems in diagnostic radiology 2007;36:1-10.
32. Gentili A, Masih S, Yao L, Seeger LL. Pictorial review: foot axes and angles. The British journal of radiology 1996;69:968-74.
33. McCauley RG, Schwartz AM, Leonidas JC, Darling DB, Bankoff MS, Swan CS, 2nd. Comparison views in extremity injury in children: an efficacy study. Radiology 1979;131:95-7.
34. Sabharwal S, Kumar A. Methods for assessing leg length discrepancy. Clin Orthop Relat Res 2008;466:2910-22.
35. ref marsh, NCRP13
36. Sikand M, Stinchcombe S, Livesley PJ. Study on the use of gonadal protection shields during paediatric pelvic X-rays. Annals of the Royal College of Surgeons of England 2003;85:422-5.
37. Bardo DM, Black M, Schenk K, Zaritzky MF. Location of the ovaries in girls from newborn to 18 years of age: reconsidering ovarian shielding. Pediatric radiology 2009;39:253-9.
38. Fawcett SL, Barter SJ. The use of gonad shielding in paediatric hip and pelvis radiographs. The British journal of radiology 2009;82:363-70.
39. American College of Radiology. ACR Practice Parameter for Communication of Diagnostic Imaging Findings. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/CommunicationDiag.pdf. Accessed May 2, 2022.
40. American College of Radiology. ACR-AAPM Technical Standard for Diagnostic Medical Physics Performance Monitoring of Radiographic Equipment. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/RadEquip.pdf. Accessed May 2, 2022.

*Practice parameters and technical standards are published annually with an effective date of October 1 in the year in which amended, revised, or approved by the ACR Council. For practice parameters and technical standards published before 1999, the effective date was January 1 following the year in which the practice parameter or technical standard was amended, revised, or approved by the ACR Council.

Revised 2023 (Resolution 16) this Practice Parameter 2003 (Resolution 11)

Amended 2006 (Resolution 17, 34, 35)

Revised 2008 (Resolution 30)

Amended 2009 (Resolution 11)

Revised 2013 (Resolution 28)

Amended 2014 (Resolution 39)

Revised 2018 (Resolution 6)
Revised 2023 (Resolution 16)