

ACR Appropriateness Criteria[®] Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae

Expert Panel on Musculoskeletal Imaging: *Jenny T. Bencardino, MD^a, Taylor J. Stone, MD^b, Catherine C. Roberts, MD^c, Marc Appel, MD^d, Steven J. Baccei, MD^e, R. Carter Cassidy, MD^f, Eric Y. Chang, MD^g, Michael G. Fox, MD^h, Bennett S. Greenspan, MD, MSⁱ, Soterios Gyftopoulos, MD^j, Mary G. Hochman, MD^k, Jon A. Jacobson, MD^l, Douglas N. Mintz, MD^m, Gary W. Mlady, MDⁿ, Joel S. Newman, MD^o, Zehava S. Rosenberg, MD^p, Nehal A. Shah, MD^q, Kirstin M. Small, MD^q, Barbara N. Weissman, MD^r*

Abstract

Stress fractures, including both fatigue and insufficiency types, are frequently encountered in clinical practice as a source of pain in both athletes and patients with predisposing conditions. Radiography is the imaging modality of choice for baseline diagnosis. MRI has greatly improved our ability to diagnose radiographically occult stress fractures. Tc-99m bone scan and CT may also be useful as diagnostic tools. Although fatigue and insufficiency fractures can be self-limited and go onto healing even without diagnosis, there is usually value in initiating prompt therapeutic measures as incomplete stress fractures have the potential of progressing to completion and requiring more invasive treatment or delay in return to activity. This is particularly important in the setting of stress fractures of the femoral neck. Accuracy in the identification of these injuries is also relevant because the differential diagnosis includes entities that would otherwise be treated significantly different (ie, osteoid osteoma, osteomyelitis, and metastasis).

^aPrincipal Author and Panel Vice-Chair, New York University School of Medicine, New York, New York.

^bResearch Author, Charlotte Radiology, Charlotte, North Carolina.

^cPanel Chair, Mayo Clinic, Phoenix, Arizona.

^dJames J. Peters VA Medical Center, Bronx, New York; American Academy of Orthopaedic Surgeons.

^eUMass Memorial Medical Center, Worcester, Massachusetts.

^fUK Healthcare Spine and Total Joint Service, Lexington, Kentucky; American Academy of Orthopaedic Surgeons.

^gVA San Diego Healthcare System, San Diego, California.

^hUniversity of Virginia Health System, Charlottesville, Virginia.

ⁱMedical College of Georgia at Georgia Regents University, Augusta, Georgia.

^jNew York University Medical Center, New York, New York.

^kBeth Israel Deaconess Medical Center, Boston, Massachusetts.

^lUniversity of Michigan Medical Center, Ann Arbor, Michigan.

^mHospital for Special Surgery, New York, New York.

ⁿUniversity of New Mexico, Albuquerque, New Mexico.

^oNew England Baptist Hospital, Boston, Massachusetts.

^pHospital for Joint Diseases, New York, New York.

^qBrigham & Women's Hospital, Boston, Massachusetts.

^rSpecialty Chair, Brigham & Women's Hospital, Boston, Massachusetts.

Corresponding author: Jenny T. Bencardino, MD, Attn: Dept of Radiology, New York University, 301 E 17th Street, New York, NY 10003; e-mail: jenny.bencardino@nyumc.org.

The American College of Radiology seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document.

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Disclaimer: The ACR Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the FDA have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

The American College of Radiology Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed annually by a multidisciplinary expert panel. The guideline development and revision include an extensive analysis of current medical literature from peer-reviewed journals and the application of well-established methodologies (RAND/UCLA Appropriateness Method and Grading of Recommendations Assessment, Development, and Evaluation or GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios. In those instances where evidence is lacking or equivocal, expert opinion may supplement the available evidence to recommend imaging or treatment.

Key Words: Appropriateness Criteria, Appropriate Use Criteria, AUC, fatigue, fracture, imaging, insufficiency, MRI, radiography stress
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ACR Appropriateness Criteria® Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. Variants 1 to 12 and Table 1.

Variant 1. Suspected stress (fatigue) fracture, excluding vertebrae. First imaging study.

Radiologic Procedure	Rating	Comments	RRL
X-ray area of interest	9		Varies
MRI area of interest without IV contrast	1		○
MRI area of interest without and with IV contrast	1		○
CT area of interest without IV contrast	1		Varies
CT area of interest with IV contrast	1		Varies
CT area of interest without and with IV contrast	1		Varies
Tc-99m bone scan whole body with SPECT area of interest	1		☼☼☼
US area of interest	1		○

Note: Rating scale: 1, 2, 3 = usually not appropriate; 4, 5, 6 = may be appropriate; 7, 8, 9 = usually appropriate. IV = intravenous; RRL = relative radiation level; SPECT = single-photon emission computed tomography; US = ultrasound.

Variant 2. Suspected stress (fatigue) fracture, hip. Negative radiographs. Next imaging study.

Radiologic Procedure	Rating	Comments	RRL
MRI hip without IV contrast	9		○
Tc-99m bone scan whole body with SPECT hip	6	Timing of the study after injury and age of the patient are important considerations.	☼☼☼
X-ray hip repeat in 10-14 days	5	Because of the high risk of complications, it is not advisable to wait 10-14 days in most cases.	☼☼☼
CT hip without IV contrast	5	This procedure may be useful if MRI cannot be performed.	☼☼☼
MRI hip without and with IV contrast	1		○
CT hip with IV contrast	1		☼☼☼
CT hip without and with IV contrast	1		☼☼☼
US hip	1		○

Note: Rating scale: 1, 2, 3 = usually not appropriate; 4, 5, 6 = may be appropriate; 7, 8, 9 = usually appropriate. IV = intravenous; RRL = relative radiation level; SPECT = single-photon emission computed tomography; US = ultrasound.

Variant 3. Suspected stress (fatigue) fracture, excluding hip and vertebrae. Negative radiographs. Next imaging study.

Radiologic Procedure	Rating	Comments	RRL
X-ray area of interest repeat in 10-14 days	9		Varies
MRI area of interest without IV contrast	8	This procedure is an equivalent option. It may be used preferentially in high-risk locations.	○
CT area of interest without IV contrast	5	This procedure may offer complementary information to MRI.	Varies
Tc-99m bone scan whole body with SPECT area of interest	5	Timing of the study after injury and age of the patient are important considerations.	☼☼☼

(continued)

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