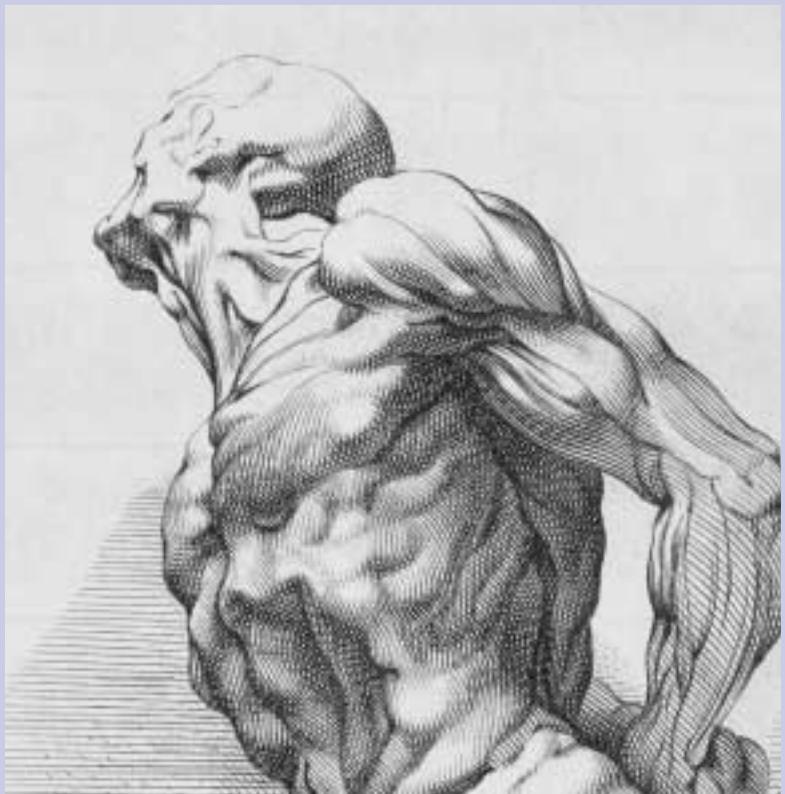


# *AIUM Practice Guideline for the Performance of a Shoulder Ultrasound Examination*



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**T**he American Institute of Ultrasound in Medicine (AIUM) is an educational, scientific, and professional society concerned with the advancement of the art and science of ultrasound in medicine and research. To promote this mission, the AIUM is pleased to publish, in conjunction with the American College of Radiology (ACR), this new Guideline for the Performance of a Shoulder Ultrasound Examination. We are indebted to the many volunteers who contributed their time, knowledge, and energy to bringing this document to completion.

The AIUM represents the entire range of clinical and basic science interests in medical diagnostic ultrasound, and, with hundreds of volunteers, the AIUM has promoted the safe and effective use of ultrasound in clinical medicine for 50 years. This document, and others like it, will continue to advance this mission.

Clinical standards and practice guidelines of the AIUM are intended to provide the medical ultrasound community with guidelines for the performance and recording of high-quality ultrasound examinations. The standards and guidelines reflect what the AIUM considers the minimum criteria for a complete examination in each area but are not intended to establish a legal standard of care. AIUM-accredited practices are expected to generally follow the standards and guidelines with the recognition that deviations from the standards and guidelines will be needed in some cases, depending on patient needs and available equipment. Practices are encouraged to go beyond the standards and guidelines to provide additional service and information as needed by their referring physicians and patients.



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## I. Introduction

**The clinical aspects of this guideline (Indications, Specifications of the Examination, and Equipment Specifications) were developed collaboratively by the American Institute of Ultrasound in Medicine (AIUM) and the American College of Radiology (ACR). Recommendations for physician requirements, procedure documentation, and quality control vary between the 2 organizations and are addressed by each separately.**

**This guideline has been developed to provide assistance to practitioners performing a sonographic examination of the shoulder. In some cases, an additional and/or specialized examination may be necessary. While it is not possible to detect every abnormality, following this guideline will maximize the detection of abnormalities of the shoulder.**

**In experienced hands, shoulder ultrasound has been demonstrated to be an accurate and cost-effective examination that is comparable to magnetic resonance imaging (MRI) for the evaluation of full-thickness rotator cuff tears.**

## II. Indications for a Shoulder Ultrasound Examination

The indications for ultrasound of the shoulder include, but are not limited to, evaluation of shoulder pain or dysfunction.

## III. Qualifications and Responsibilities of Personnel

See the AIUM Official Statement: *Training Guidelines for Physicians Who Evaluate and Interpret Diagnostic Ultrasound Examinations* and the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

## IV. Specifications of the Examination

Patients should be examined in the sitting position, preferably on a rotating seat.

Examination of the shoulder should be tailored according to the patient's clinical circumstances and range of motion.

The biceps tendon should be examined with the forearm in supination and resting on the thigh or with the arm in slight external rotation. The tendon is examined in a transverse plane (short axis) where it emerges from under the acromion to the musculotendinous junction distally. Longitudinal views (long axis) should be obtained of the biceps tendon. These views should be used to determine if the tendon is properly positioned within the bicipital groove, subluxed, dislocated, or torn.

To examine the subscapularis tendon, the arm should be in external rotation. Both transverse (long axis) and sagittal (short axis) views should be obtained. Dynamic evaluation as the patient moves from internal to external rotation may be helpful.

To examine the supraspinatus tendon, the arm can be extended posteriorly, and the palmar aspect of the hand can be placed against the superior aspect of the iliac wing with the elbow flexed and directed toward midline (instruct patient to place the hand in the back pocket). Other positioning techniques also may be helpful.

To scan the supraspinatus and infraspinatus tendons along their long axis, it is important to orient the transducer approximately 45 degrees between the sagittal and coronal planes to obtain a longitudinal view. The transducer then should be moved posteriorly to visualize the tendons.

Transverse views should be obtained by rotating the probe 90 degrees to the long axis of the tendons. The more posterior aspect of the infraspinatus and teres minor tendons should be examined by placing the transducer at the level of the glenohumeral joint below the scapular spine while the forearm rests on the thigh with the hand supinated. Internal and external rotation of the forearm is helpful in identifying the infraspinatus muscle and its tendon and in detecting small joint effusions.

To visualize the teres minor tendon, the probe should be angled slightly inferiorly. Throughout the examination of the rotator cuff, the cuff should be compressed to detect nonretracted tears. In the evaluation of rotator cuff tears, comparison with the contralateral side may be useful.

While examining the rotator cuff, it is also important to evaluate for bursal thickening, fluid, loose bodies, tendon calcification, and muscle and bony abnormalities. If symptoms warrant, the acromioclavicular joint, the supraspinatus notch, and the spinoglenoid notch also should be evaluated. Dynamic evaluation of the rotator cuff also is useful.

## V. Documentation

Adequate documentation is essential for high-quality patient care. There should be a permanent record of the sonographic examination and its interpretation. Images of all appropriate areas, both normal and abnormal, should be recorded in an appropriate format. Variations from normal size should be accompanied by measurements. Images are to be labeled appropriately with the examination date, patient identification, and image orientation. A report of the sonographic findings should be included in the patient's medical record. Retention of the permanent record of the sonographic examination should be consistent both with clinical need and with the relevant legal and local health-care facility requirements.

Reporting should be in accordance with the *AIUM Standard for Documentation of an Ultrasound Examination*.

## VI. Equipment Specifications

Shoulder ultrasound should be performed with real-time scanners using high-frequency linear array transducers. Center frequencies between 7 and 10 MHz are usually best for imaging the rotator cuff. When the rotator cuff is much deeper than normal, a 5-MHz transducer may be required for adequate penetration.

## VII. Quality Control and Improvement, Safety, Infection Control, and Patient Education Concerns

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the *AIUM*

*Standards and Guidelines for the Accreditation of Ultrasound Practices*. Equipment performance monitoring should be in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

## Acknowledgments

This guideline was developed by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with the American College of Radiology (ACR), according to the process described in the *ACR Practice Guidelines and Technical Standards Book*.

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## References

1. Bachmann GF, Melzer C, Heinrichs CM, et al. Diagnosis of rotator cuff lesions: comparison of US and MRI on 38 joint specimens. *Eur Radiol* 1997; 7:192-197.

2. Bouffard JA, Lee SM, Dhanju J. Ultrasonography of the shoulder. *Semin Ultrasound CT MR* 2000; 21:164–191.
3. Erickson SJ. High-resolution imaging of the musculoskeletal system. *Radiology* 1997; 205:593–618.
4. Farin PU, Jaroma H. Acute traumatic tears of the rotator cuff: value of sonography. *Radiology* 1995; 197:269–273.
5. Farin PU, Kaukanen E, Jaroma H, et al. Site and size of rotator cuff tear: findings at ultrasound, double-contrast arthrography, and computed tomography arthrography with surgical correlation. *Invest Radiol* 1996; 31:387–394.
6. Hammar MV, Wintzell GB, Astrom KG, et al. Role of US in the preoperative evaluation of patients with anterior shoulder instability. *Radiology* 2001; 219: 29–34.
7. Lund PJ, Nisbet JK, Valencia FG, et al. Current sonographic applications in orthopedics. *AJR Am J Roentgenol* 1996; 166:889–895.
8. Mack LA, Matsen FA III, Kilcoyne RF, et al. US evaluation of the rotator cuff. *Radiology* 1985; 157:205–209.
9. Sonnabend DH, Hughes JS, Giuffre BM, et al. The clinical role of shoulder ultrasound. *Aust NZ J Surg* 1997; 67:630–633.
10. Teefey SA, Hasan SA, Middleton WD, et al. Ultrasonography of the rotator cuff: a comparison of the ultrasonographic and arthroscopic findings in one hundred consecutive cases. *J Bone Joint Surg Am* 2000; 82:498–504.
11. Teefey SA, Middleton WD, Yamaguchi K. Shoulder sonography. State of the art. *Radiol Clin North Am* 1999; 37:767–785.
12. van Holsbeeck MT, Kolowich PA, Eyler WR, et al. Ultrasound depiction of partial-thickness tear of the rotator cuff. *Radiology* 1995; 197:443–446.
13. van Holsbeeck MT, Craig JG, Bouffard JA, et al. Categorical course presented at the 1996 meeting of the Radiological Society of North America (RSNA). 1996; 177–123.
14. Wiener SN, Seitz WH Jr. Sonography of the shoulder in patients with tears of the rotator cuff: accuracy and value for selecting surgical options. *AJR Am J Roentgenol* 1993; 160:103–107.
15. Winter TC III, Teefey SA, Middleton WD. Musculoskeletal ultrasound: an update. *Radiol Clin North Am* 2001; 39:465–483.
16. Winter TL III, Richard ML, Matsen FA III. Ultrasound of the shoulder. *RSNA EJ* 1997; Vol 1 <<http://ej.rsna.org>>.
17. Yamaguchi K, Tetro AM, Blam O, et al. Natural history of asymptomatic rotator cuff tears: a longitudinal analysis of asymptomatic tears detected sonographically. *J Shoulder Elbow Surg* 2001; 10:199–203.