

**American College of Radiology
ACR Appropriateness Criteria®**

Shoulder Pain-Traumatic

Variant 1: Traumatic shoulder pain. Any etiology. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography shoulder	Usually appropriate		⊕ <0.1 mSv		9	9	0	0	0	0	0	0	0	0	15
CT arthrography shoulder	Usually not appropriate		⊕⊕⊕⊕ 10-30 mSv		1	1	15	0	0	0	0	0	0	0	0
CT shoulder without IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	9	0	3	1	2	0	0	0	0
MR arthrography shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	0	0	1	0	0	0	0
MRI shoulder without IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	1	0	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	1	1	0	0	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	0	0	1	0	0	0	0

Tc-99m bone scan shoulder	Usually not appropriate		☹☹☹ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		☹☹☹☹ 10-30 mSv	☹☹☹☹☹ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0

Variant 2: Traumatic shoulder pain. Nonlocalized shoulder pain. Negative radiographs. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI shoulder without IV contrast	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	0	0	1	2	3	9
CT arthrography shoulder	May be appropriate		☹☹☹☹ 10-30 mSv		5	5	6	0	0	1	6	2	0	0	0
US shoulder	May be appropriate (Disagreement)		○ 0 mSv	○ 0 mSv [ped]	5	3	3	1	5	1	4	0	2	0	0
MR arthrography shoulder	May be appropriate		○ 0 mSv	○ 0 mSv [ped]	5	5	0	0	1	0	9	2	3	0	1
CT shoulder without IV contrast	Usually not appropriate		☹☹☹ 1-10 mSv		3	3	2	3	4	0	5	1	0	1	0
Tc-99m bone scan shoulder	Usually not appropriate		☹☹☹ 1-10 mSv		1	1	12	1	1	0	0	0	0	1	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	0	1	0	0
CT shoulder without and with IV contrast	Usually not appropriate		☹☹☹ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate		☹☹☹ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0

FDG-PET/CT skull base to mid-thigh	Usually not appropriate		☼☼☼☼ 10-30 mSv	☼☼☼☼☼☼ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0	0
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Variant 3: Traumatic shoulder pain. Radiographs show humeral head or neck fracture. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT shoulder without IV contrast	Usually appropriate		☼☼☼ 1-10 mSv		9	9	0	0	0	0	0	0	1	1	13
MRI shoulder without IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	3	3	6	1	2	0	7	0	0	0	0
CT arthrography shoulder	Usually not appropriate		☼☼☼☼ 10-30 mSv		1	1	11	2	0	1	0	1	0	0	0
CT shoulder with IV contrast	Usually not appropriate		☼☼☼ 1-10 mSv		1	1	13	1	0	1	0	0	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		☼☼☼ 1-10 mSv		1	1	14	0	0	1	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		☼☼☼☼ 10-30 mSv	☼☼☼☼☼☼ 10-30 mSv [ped]	1	1	11	1	1	2	0	0	0	0	0
MR arthrography shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	13	0	0	0	1	1	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	1	0	1	0	0	0	0
Tc-99m bone scan shoulder	Usually not appropriate		☼☼☼ 1-10 mSv		1	1	8	2	0	3	1	1	0	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	9	2	1	2	0	1	0	0	0

Variant 4: Traumatic shoulder pain. Radiographs show scapula fracture. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT shoulder without IV contrast	Usually appropriate		⊕⊕⊕ 1-10 mSv		9	9	0	0	0	0	0	0	0	1	14
MRI shoulder without IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	3	3	4	1	4	2	3	1	0	0	0
CT arthrography shoulder	Usually not appropriate		⊕⊕⊕⊕ 10-30 mSv		1	1	14	0	1	0	0	0	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	14	0	0	1	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	1	1	11	0	1	3	0	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	13	1	0	1	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	13	1	0	1	0	0	0	0	0
Tc-99m bone scan shoulder	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	8	3	0	4	0	0	0	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	14	1	0	0	0	0	0	0	0
MR arthrography shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0

Variant 5: Traumatic shoulder pain. Radiographs show Bankart or Hill-Sachs lesion. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MR arthrography shoulder	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	9	9	1	0	0	0	1	0	0	1	12
MRI shoulder without IV contrast	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	0	2	5	3	5
CT arthrography shoulder	May be appropriate		⊗⊗⊗⊗ 10-30 mSv		6	6	0	1	0	0	5	4	3	2	0
CT shoulder without IV contrast	May be appropriate		⊗⊗⊗ 1-10 mSv		6	6	0	0	0	0	6	3	5	2	0
CT shoulder with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	1	1	2	0	0	0	0
Tc-99m bone scan shoulder	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	14	0	0	0	0	0	1	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	13	0	1	0	0	1	0	0	0

Variant 6: Traumatic shoulder pain. Radiographs normal. Physical examination and history consistent with dislocation event or instability. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MR arthrography shoulder	Usually		○ 0 mSv	○ 0 mSv	9	9	0	0	0	0	0	0	1	0	14

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations											
							1	2	3	4	5	6	7	8	9			
	appropriate			[ped]														
MRI shoulder without IV contrast	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	0	0	2	3	3	5	2			
CT arthrography shoulder	May be appropriate		⊗⊗⊗⊗ 10-30 mSv		6	6	0	0	0	0	4	4	4	1	2			
CT shoulder without IV contrast	May be appropriate		⊗⊗⊗ 1-10 mSv		4	4	5	0	2	1	6	0	1	0	0			
CT shoulder with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	12	1	1	0	0	1	0	0	0			
CT shoulder without and with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0			
FDG-PET/CT skull base to mid-high	Usually not appropriate		⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0			
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	0	0	2	0	1	0	0	0			
Tc-99m bone scan shoulder	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	14	0	0	0	0	0	1	0	0			
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	1	1	2	1	0	0	0			

Variant 7: Traumatic shoulder pain. Radiographs normal. Physical examination findings consistent with labral tear. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations												
							1	2	3	4	5	6	7	8	9				
MR arthrography shoulder	Usually		○ 0 mSv	○ 0 mSv	9	9	0	0	0	0	0	0	0	0	1	14			

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
	appropriate			[ped]											
CT arthrography shoulder	Usually appropriate		⊕⊕⊕⊕ 10-30 mSv		7	7	0	0	0	0	3	3	6	3	0
MRI shoulder without IV contrast	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	1	0	1	2	5	3	3
CT shoulder without IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	11	1	1	1	0	0	1	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	2	0	1	0	0	0	0
Tc-99m bone scan shoulder	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	0	0	1	1	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	14	1	0	0	0	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0

VARIANT 8: Traumatic shoulder pain. Radiographs normal. Physical examination findings consistent with rotator cuff tear. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI shoulder without IV contrast	Usually		○ 0 mSv	○ 0 mSv	9	9	0	0	0	0	0	0	2	3	10

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations											
							1	2	3	4	5	6	7	8	9			
	appropriate			[ped]														
MR arthrography shoulder	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	2	1	4	3	5			
US shoulder	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	1	0	4	5	5			
CT arthrography shoulder	May be appropriate		⊗⊗⊗⊗ 10-30 mSv		6	6	1	0	0	1	2	7	1	3	0			
CT shoulder with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0			
CT shoulder without and with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0			
CT shoulder without IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	12	1	1	0	0	0	0	1	0			
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0			
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	1	0	1	0	0	0	0			
Tc-99m bone scan shoulder	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	14	1	0	0	0	0	0	0	0			

Variant 9: Traumatic shoulder pain. Radiographs already performed. Physical examination consistent with vascular compromise. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations											
							1	2	3	4	5	6	7	8	9			
CTA shoulder with IV contrast	Usually		⊗⊗⊗ 1-10		9	9	1	0	0	0	0	0	0	1	13			

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
	appropriate		mSv												
Arteriography shoulder	Usually appropriate		⊕⊕⊕ 1-10 mSv		7	7	1	0	0	0	4	0	5	1	4
US duplex Doppler shoulder	May be appropriate		○ 0 mSv	○ 0 mSv [ped]	4	4	5	1	0	3	6	1	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	13	0	1	0	1	0	0	0	0
CT shoulder without IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	11	0	2	0	2	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	1	0	0	0	0	1	0
MRI shoulder without IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	13	0	1	1	0	0	0	0	0
Tc-99m 3-phase bone scan shoulder	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	12	1	1	0	0	1	0	0	0
CT shoulder with IV contrast	Usually not appropriate		⊕⊕⊕ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	1
MRA shoulder with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	3	1	0	1	0	0	0	0

Variant 10: Traumatic shoulder pain. Radiographs already performed. Neuropathic syndrome (excluding plexopathy). Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI shoulder without IV contrast	Usually appropriate		○ 0 mSv	○ 0 mSv [ped]	8	8	1	0	0	0	2	1	3	3	5
Tc-99m bone scan shoulder	May be appropriate		⊗⊗⊗ 1-10 mSv		4	4	4	1	1	6	2	2	0	0	0
CT shoulder without IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		3	3	5	0	4	3	2	0	1	0	0
CT arthrography shoulder	Usually not appropriate		⊗⊗⊗⊗ 10-30 mSv		1	1	13	0	2	0	0	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	9	0	4	0	1	0	0	1	0
CT shoulder without and with IV contrast	Usually not appropriate		⊗⊗⊗ 1-10 mSv		1	1	12	0	1	0	2	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate		⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
MR arthrography shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	1	0	0	0	0	0	0
US shoulder	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	0	1	2	1	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate		○ 0 mSv	○ 0 mSv [ped]	1	1	10	3	1	0	2	0	0	0	0

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality:** The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at www.acr.org/ac.