









19 (19098184)	3
34 (24560469)	4
35 (21940587)	3
18 (23716283)	3
36 (24172671)	4
37 (19305272)	2

CT shoulder without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		3	3	2	3	4	0	5	1	0	1	0
Bone scan shoulder	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	12	1	1	0	0	0	0	1	0

References	Study Quality
30 (12105806)	4
31 (23531735)	2
32 (8444918)	3
33 (23835267)	3

MRI shoulder without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	2	0	1	0	1	0	0
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References	Study Quality
34 (24560469)	4
35 (21940587)	3
36 (24172671)	4
37 (19305272)	2

CT shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
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CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0
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FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
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References	Study Quality
26 (24177044)	3









MRI shoulder without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	13	1	0	1	0	0	0	0	0
		References		Study Quality											
		49 (26295635)		4											
Bone scan shoulder	Usually not appropriate	Limited	⊗⊗⊗ 1-10 mSv		1	1	8	3	0	4	0	0	0	0	0
		References		Study Quality											
		31 (23531735)		2											
		32 (8444918)		3											
US shoulder	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	14	1	0	0	0	0	0	0	0
MR arthrography shoulder	Usually not appropriate	Expert Consensus	○ 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	Strong	○ 0 mSv	○ 0 mSv [ped]	9	9	1	0	0	0	1	0	0	1	12
		References		Study Quality											
		12 (19556150)		2											
		17 (24060014)		3											
		19 (19098184)		3											
		18 (23716283)		3											
		52 (25028704)		3											
		11 (25231817)		3											
MRI shoulder without IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	0	2	5	3	5
		References		Study Quality											

12 (19556150)	2
17 (24060014)	3
19 (19098184)	3
20 (24794570)	3
18 (23716283)	3
52 (25028704)	3

CT arthrography shoulder	May be appropriate	Strong	☼☼☼☼ 10-30 mSv		6	6	0	1	0	0	5	4	3	2	0
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References	Study Quality
12 (19556150)	2
13 (21074344)	2

CT shoulder without IV contrast	May be appropriate	Strong	☼☼☼ 1-10 mSv		6	6	0	0	0	0	6	3	5	2	0
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References	Study Quality
12 (19556150)	2
18 (23716283)	3
11 (25231817)	3
53 (24318071)	2

CT shoulder with IV contrast	Usually not appropriate	Strong	☼☼☼ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
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References	Study Quality
12 (19556150)	2
18 (23716283)	3
11 (25231817)	3
53 (24318071)	2

CT shoulder without and with IV contrast	Usually not appropriate	Strong	☼☼☼ 1-10 mSv		1	1	15	0	0	0	0	0	0	0	0
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References	Study Quality
12 (19556150)	2
18 (23716283)	3
11 (25231817)	3





FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	1	1	12	0	0	2	0	1	0	0	0	0

References	Study Quality
12 (19556150)	2
17 (24060014)	3
19 (19098184)	3
18 (23716283)	3

Bone scan shoulder	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	14	0	0	0	0	0	1	0	0
US shoulder	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	1	1	2	1	0	0	0

References	Study Quality
17 (24060014)	3
61 (23980228)	3

**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 appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	0	0	0	0	1	14

References	Study Quality
19 (19098184)	3
20 (24794570)	3
60 (25218253)	3
62 (17896393)	4
63 (21907516)	2
64 (20950767)	3

			59 (22401678)		3													
			65 (23801390)		3													
			66 (17504318)		4													
CT arthrography shoulder	Usually appropriate	Strong	☼☼☼☼ 10-30 mSv		7	7	0	0	0	0	3	3	6	3	0			
			References		Study Quality													
			12 (19556150)		2													
			13 (21074344)		2													
			67 (22358006)		2													
MRI shoulder without IV contrast	Usually appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	1	0	1	2	5	3	3			
			References		Study Quality													
			17 (24060014)		3													
			19 (19098184)		3													
CT shoulder without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	11	1	1	1	0	0	1	0	0			
US shoulder	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	2	0	1	0	0	0	0			
Bone scan shoulder	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0			
MRI shoulder without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	0	0	1	1	0	0	0			
			References		Study Quality													
			17 (24060014)		3													
			19 (19098184)		3													
CT shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	14	1	0	0	0	0	0	0	0			
CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 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	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0	0
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**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 appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	0	0	0	2	3	10

References	Study Quality
12 (19556150)	2
17 (24060014)	3
68 (25677796)	M
69 (17724551)	4

MR arthrography shoulder	Usually appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	2	1	4	3	5
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References	Study Quality
17 (24060014)	3
19 (19098184)	3
54 (22173386)	3

US shoulder	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	1	0	4	5	5
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References	Study Quality
17 (24060014)	3
70 (18591598)	2
71 (18160242)	3
72 (18449121)	3
22 (20514507)	2
44 (17149764)	2
73 (15674840)	2

25 (20848574)	2
74 (18651142)	2
24 (19457838)	M

CT arthrography shoulder	May be appropriate	Limited	☼☼☼☼ 10-30 mSv		6	6	1	0	0	1	2	7	1	3	0
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References	Study Quality
12 (19556150)	2

CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	13	1	1	0	0	0	0	0	0
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CT shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	0
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CT shoulder without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	12	1	1	0	0	0	0	1	0
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FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 3-10 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
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References	Study Quality
28 (24012359)	3
29 (17042899)	3

MRI shoulder without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	12	1	1	0	1	0	0	0	0
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References	Study Quality
12 (19556150)	2
17 (24060014)	3
68 (25677796)	M
69 (17724551)	4

Bone scan shoulder	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	14	1	0	0	0	0	0	0	0
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References	Study Quality
33 (23835267)	3





CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		1	1	14	0	1	0	0	0	0	0	1
MRA shoulder with IV contrast	Usually not appropriate	Expert Consensus	○ 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	Limited	○ 0 mSv	○ 0 mSv [ped]	8	8	1	0	0	0	2	1	3	3	5

References	Study Quality
83 (22976233)	4
81 (25953287)	4
82 (27999953)	4

Bone scan shoulder	May be appropriate	Limited	⊕⊕⊕ 1-10 mSv		4	4	4	1	1	6	2	2	0	0	0
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References	Study Quality
84 (6544813)	4
85 (8228057)	3
86 (19851172)	3
87 (22473897)	M
88 (17515744)	2
89 (7642927)	M
90 (28301606)	M

CT shoulder without IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		3	3	5	0	4	3	2	0	1	0	0
CT arthrography shoulder	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv		1	1	13	0	2	0	0	0	0	0	0

CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	9	0	4	0	1	0	0	1	0
CT shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 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	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	15	0	0	0	0	0	0	0	0
MR arthrography shoulder	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	1	0	0	0	0	0	0
US shoulder	Usually not appropriate	Expert Consensus	○ 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	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	10	3	1	0	2	0	0	0	0

References	Study Quality
83 (22976233)	4
81 (25953287)	4
82 (27999953)	4

## **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](http://www.acr.org/ac).