

American College of Radiology ACR Appropriateness Criteria®

Chronic Knee Pain

Variant 1: Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography knee	Usually appropriate	Moderate	⊕ <0.1 mSv	⊕ <0.03 mSv [ped]	9	9	0	0	0	0	0	0	0	0	16
		References		Study Quality											
		10 (24751528)		4											
		11 (26797169)		4											
		12 (23118113)		2											
		13 (22438445)		3											
CT arthrography knee	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0
CT knee with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0
CT knee without IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	11	1	1	2	0	1	0	0	0
CT knee without and with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0
Image-guided aspiration knee	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	14	0	1	1	0	0	0	0	0

MR arthrography knee	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	14	1	0	0	1	0	0	0	0
MRI knee without IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	1	1	11	0	2	2	0	0	0	1	0
		References	Study Quality												
		2 (25086957)	4												
MRI knee without and with IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	1	1	13	0	2	0	0	0	1	0	0
		References	Study Quality												
		2 (25086957)	4												
Bone scan knee	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	13	2	1	0	0	0	0	0	0
US knee	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	12	1	1	0	2	0	0	0	0
Radiography hip ipsilateral	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	11	0	1	1	2	0	1	0	0

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI knee without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	2	4	10
		References		Study Quality											
		21 (18784100)		4											
		28 (28473086)		4											
		11 (26797169)		4											
		13 (22438445)		3											
		15 (25442030)		4											

17 (21647860)	2
18 (23321609)	4
19 (22736267)	2
20 (22012846)	4
22 (25022807)	2
23 (24020939)	2
24 (23377800)	2
25 (20829200)	4
26 (21360498)	2
27 (26290325)	3
29 (23845401)	3
30 (24583066)	2
31 (25724258)	3
32 (22421281)	2
33 (21969432)	4
34 (24651059)	4
35 (23982988)	2
36 (22184170)	4
37 (20418103)	4
38 (24119160)	2
39 (21618936)	4
40 (22862803)	4
41 (23478924)	4
42 (20884045)	4
43 (22488011)	4
44 (22134205)	4
45 (26242763)	2

CT arthrography knee	May be appropriate	Limited	☼ <0.1 mSv	☼☼ 0.03-0.3 mSv [ped]	5	5	1	0	0	3	5	5	1	1	0
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References	Study Quality
16 (22447237)	4

CT knee without IV contrast	May be appropriate	Limited	⚡ <0.1 mSv	⚡⚡ 0.03-0.3 mSv [ped]	5	5	0	1	0	1	11	4	0	0	0
		References	Study Quality												
		15 (25442030)	4												
Image-guided aspiration knee	May be appropriate	Limited	Varies	Varies	5	5	1	0	0	1	12	3	0	0	0
		References	Study Quality												
		10 (24751528)	4												
US knee	May be appropriate (Disagreement)	Expert Opinion	0 0 mSv	0 0 mSv [ped]	5	5	1	1	1	1	8	2	2	1	0
		References	Study Quality												
		10 (24751528)	4												
		17 (21647860)	2												
		37 (20418103)	4												
		44 (22134205)	4												
		49 (22996306)	2												
Radiography hip ipsilateral	May be appropriate	Limited	⚡⚡⚡ 1-10 mSv	⚡⚡⚡ 0.3-3 mSv [ped]	5	5	2	1	0	2	10	1	1	0	0
		References	Study Quality												
		14 (23781753)	4												
Radiography lumbar spine	May be appropriate	Expert Consensus	⚡⚡⚡ 1-10 mSv	⚡⚡ 0.03-0.3 mSv [ped]	5	5	3	1	0	1	11	0	1	0	0
MR arthrography knee	May be appropriate	Limited	0 0 mSv	0 0 mSv [ped]	4	4	6	0	2	6	3	0	0	0	0
		References	Study Quality												
		10 (24751528)	4												
MRI knee without and with IV contrast	Usually not appropriate	Strong	0 0 mSv	0 0 mSv [ped]	2	2	8	1	1	2	2	1	1	0	0
		References	Study Quality												

		15 (25442030)	4													
		17 (21647860)	2													
		42 (20884045)	4													
		46 (23277189)	2													
		47 (21187293)	2													
		48 (25278070)	2													
CT knee with IV contrast	Usually not appropriate	Limited	☼ <0.1 mSv	☼☼ 0.03-0.3 mSv [ped]	1	1	13	1	0	1	1	0	0	0	0	
		References	Study Quality													
		15 (25442030)	4													
CT knee without and with IV contrast	Usually not appropriate	Limited	☼ <0.1 mSv	☼☼ 0.03-0.3 mSv [ped]	1	1	12	1	0	2	1	0	0	0	0	
		References	Study Quality													
		15 (25442030)	4													
Bone scan knee	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	12	3	0	0	1	0	0	0	0	

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI knee without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	3	1	12
		References		Study Quality											
		50 (18552309)		3											
		41 (23478924)		4											
		51 (24856089)		2											
		52 (21327672)		2											
		53 (24685525)		2											

		54 (24048551)		1													
CT arthrography knee	May be appropriate	Limited	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	6	6	1	0	0	1	4	3	5	2	0		
		References		Study Quality													
		16 (22447237)		4													
CT knee without IV contrast	May be appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	5	5	0	0	1	1	11	4	0	0	0		
MR arthrography knee	May be appropriate (Disagreement)	Expert Opinion	○ 0 mSv	○ 0 mSv [ped]	5	5	3	0	0	2	7	4	1	0	0		
		References		Study Quality													
		10 (24751528)		4													
		16 (22447237)		4													
US knee	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	7	8	0	0	1	1	0	0	0		
CT knee with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	11	3	0	2	0	0	0	0	0		
CT knee without and with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	13	1	1	1	0	0	0	0	0		
Image-guided aspiration knee	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	13	1	0	2	0	0	0	0	0		
MRI knee without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	0	1	1	1	0	0	0		
		References		Study Quality													
		16 (22447237)		4													
Bone scan knee	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv		1	1	14	2	0	0	0	0	0	0	0		
Radiography hip ipsilateral	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕ 0.3-3 mSv [ped]	1	1	12	2	1	1	0	0	0	0	0		

Variant 4: Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial knee radiograph demonstrates degenerative changes or chondrocalcinosis. Next imaging procedure.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI knee without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	1	0	0	1	1	6	2	3	2
		References		Study Quality											
		58 (20360517)		3											
		10 (24751528)		4											
		11 (26797169)		4											
		18 (23321609)		4											
		19 (22736267)		2											
		55 (26316262)		3											
		56 (24418678)		2											
		57 (25746322)		2											
		59 (24821663)		3											
Image-guided aspiration knee	May be appropriate (Disagreement)	Expert Opinion	Varies	Varies	5	5	3	1	0	2	7	4	0	0	0
		References		Study Quality											
		61 (26116548)		2											
CT knee without IV contrast	May be appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕⊕ 0.03-0.3 mSv [ped]	4	4	5	1	2	1	7	1	0	0	0
MRI knee without and with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	8	1	1	2	2	1	1	0	0
		References		Study Quality											
		58 (20360517)		3											
		10 (24751528)		4											
		11 (26797169)		4											

		18 (23321609)	4												
		19 (22736267)	2												
		55 (26316262)	3												
		56 (24418678)	2												
		57 (25746322)	2												
		59 (24821663)	3												
US knee	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	7	2	0	3	5	0	0	0	0
		References	Study Quality												
		11 (26797169)	4												
		60 (25691769)	1												
CT arthrography knee	Usually not appropriate	Limited	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	10	0	0	3	3	0	1	0	0
		References	Study Quality												
		11 (26797169)	4												
CT knee with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	12	1	2	1	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	12	1	1	2	0	0	0	0	0
MR arthrography knee	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	0	0	1	1	0	0	0
Bone scan knee	Usually not appropriate	Limited	⊕⊕⊕ 1-10 mSv		1	1	10	2	2	1	1	0	0	0	0
		References	Study Quality												
		11 (26797169)	4												
Radiography hip ipsilateral	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕ 0.3-3 mSv [ped]	1	1	12	1	1	0	2	0	0	0	0

Variant 5: Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial knee radiograph demonstrates signs of prior osseous injury (ie, Second fracture, tibial spine avulsion, etc.). Next imaging procedure.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI knee without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	2	2	3	9
		References		Study Quality											
		41 (23478924)		4											
		65 (20978758)		2											
CT arthrography knee	May be appropriate	Strong	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	5	5	0	0	0	2	7	5	2	1	0
		References		Study Quality											
		63 (11997545)		2											
		16 (22447237)		4											
		62 (18329214)		2											
		64 (10966722)		2											
CT knee without IV contrast	May be appropriate	Limited	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	5	5	0	0	0	2	13	2	0	0	0
		References		Study Quality											
		15 (25442030)		4											
CT knee with IV contrast	Usually not appropriate	Limited	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	13	1	0	1	0	1	0	0	0
		References		Study Quality											
		15 (25442030)		4											
CT knee without and with IV contrast	Usually not appropriate	Limited	⊕ <0.1 mSv	⊕⊕ 0.03-0.3 mSv [ped]	1	1	13	1	0	1	0	1	0	0	0
		References		Study Quality											

		15 (25442030)		4											
Image-guided aspiration knee	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	14	0	1	1	0	0	0	0	0
MR arthrography knee	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	1	1	0	1	1	0	0
MRI knee without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	2	0	0	0	0
		References		Study Quality											
		41 (23478924)		4											
		65 (20978758)		2											
Bone scan knee	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	13	1	1	0	0	1	0	0	0
US knee	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	2	1	1	0	0	0	0	0
Radiography hip ipsilateral	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	12	2	0	0	1	0	0	1	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.