American College of Radiology
ACR Appropriateness Criteria®

Acute Trauma to the Knee

Variant 1: Adult or child >1 year old. Fall or twisting injury, no focal tenderness, no effusion; able to walk. First study.

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 not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
X-ray knee	Usually not appropriate		☢ <0.1 mSv	☢ <0.03 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
CT knee without IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0

US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

Variant 2: Adult or child >1 year old. Fall or twisting injury, with one or more of the following: focal tenderness, effusion, inability to bear weight. First study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
X-ray knee	Usually appropriate		☢ <0.1 mSv	☢ <0.03 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
MRI knee without IV contrast	May be appropriate		O 0 mSv	O 0 mSv [ped]	5	n/a	0	0	0	0	0	0	0	0	0
CT knee without IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		2	n/a	0	0	0	0	0	0	0	0	0
US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

Variant 3: Adult or child >1 year old. Fall or twisting injury with either no fracture or a Segond fracture seen on a radiograph, suspect internal derangement. Next study.

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		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
CT knee without IV contrast	May be appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	5	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0
US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

Variant 4: Adult or child >1 year old. Fall or twisting injury with a tibial plateau fracture on a radiograph, with additional bone or soft-tissue injury suspected. Next study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT knee without IV contrast	Usually appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
MRI knee without IV contrast	Usually appropriate		O 0 mSv	O 0 mSv [ped]	7	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		1	n/a	0	0	0	0	0	0	0	0	0
US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

Variant 5: Adult or child >1 year old. Injury to knee, mechanism unknown. Focal patellar tenderness, effusion, able to walk.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
X-ray knee	Usually appropriate		☢ <0.1 mSv	☢ <0.03 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0

MRI knee without IV contrast	May be appropriate		O 0 mSv	O 0 mSv [ped]	5	n/a	0	0	0	0	0	0	0	0	0
CT knee without IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		2	n/a	0	0	0	0	0	0	0	0	0
US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0

Variant 6: Adult or child >1 year old. Significant trauma to the knee from motor vehicle accident, suspect knee dislocation.

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		O 0 mSv	O 0 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0
X-ray knee	Usually appropriate		☢ <0.1 mSv	☢ <0.03 mSv [ped]	9	n/a	0	0	0	0	0	0	0	0	0

CTA lower extremity with IV contrast	Usually appropriate		☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	n/a	0	0	0	0	0	0	0	0	0
Arteriography lower extremity	Usually appropriate		☢☢ 0.1-1mSv	☢☢☢ 0.3-3 mSv [ped]	7	n/a	0	0	0	0	0	0	0	0	0
MRA knee without and with IV contrast	Usually appropriate		O 0 mSv	O 0 mSv [ped]	7	n/a	0	0	0	0	0	0	0	0	0
MRA knee without IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	3	n/a	0	0	0	0	0	0	0	0	0
CT knee without IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
Tc-99m bone scan with SPECT lower extremity	Usually not appropriate		☢☢☢ 1-10 mSv		2	n/a	0	0	0	0	0	0	0	0	0
US knee	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0
CT knee without and with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
CT knee with IV contrast	Usually not appropriate		☢ <0.1 mSv	☢☢ 0.03-0.3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
MRI knee without and with IV contrast	Usually not appropriate		O 0 mSv	O 0 mSv [ped]	1	n/a	0	0	0	0	0	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.**