American College of Radiology  
ACR Appropriateness Criteria®

Acute Trauma to the Knee

Variant 1:  Adult or child 5 years of age or older. Fall or acute twisting trauma to the knee. No focal tenderness, no effusion, able to walk. Initial imaging.

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CT knee with IV contrast

CT knee without IV contrast

CT knee without and with IV contrast
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Variant 2: Adult or child 5 years of age or older. Fall or acute twisting trauma to the knee. One or more of the following: focal tenderness, effusion, inability to bear weight. Initial imaging.
CT knee without IV contrast | Usually not appropriate | Expert Consensus | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 10 | 4 | 1 | 1 | 1 | 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 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0

MRA knee without IV contrast | Usually not appropriate | Expert Consensus | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0

MRA knee without and with IV contrast | Usually not appropriate | Expert Consensus | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0

MR arthrography knee | Usually not appropriate | Expert Consensus | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0

MRI knee without IV contrast | Usually not appropriate | Expert Consensus | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 13 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0

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US knee | Usually not appropriate | Expert Consensus | 0 0 mSv | 0 0 mSv [ped] | 1 | 1 | 11 | 4 | 0 | 0 | 1 | 1 | 0 | 0 | 0

Bone scan with SPECT or SPECT/CT knee | Usually not appropriate | Expert Consensus | ☢☢☢ 1-10 mSv | ☢☢☢ 1-10 mSv [ped] | 1 | 1 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0

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Variant 4: Skeletally immature child. Fall or acute twisting trauma to the knee. No fracture seen on radiographs. Suspect occult fracture or internal derangement. Next study.

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### Bone scan with SPECT or SPECT/CT lower extremity

- **Procedure**: Bone scan with SPECT or SPECT/CT lower extremity
- **Category**: Usually not appropriate
- **SOE**: Limited
- **Rating**: 1
- **Median**: n/a
- **Adults RRL**: 1-10 mSv
- **Pediatric RRL**: 1-10 mSv
- **References**: 37 (12218448), 38 (16894322), 39 (25558700)
- **Study Quality**: 3

### US knee

- **Procedure**: US knee
- **Category**: Usually not appropriate
- **SOE**: Strong
- **Rating**: 1
- **Median**: 1
- **Adults RRL**: 0 mSv
- **Pediatric RRL**: 0 mSv
- **References**: 40 (16786321), 42 (25911713), 44 (21982460), 45 (23412237), 46 (25916746), 47 (29466145), 48 (28343806), 49 (27145775)
- **Study Quality**: 2

### MR arthrography knee

- **Procedure**: MR arthrography knee
- **Category**: Usually not appropriate
- **SOE**: Strong
- **Rating**: 1
- **Median**: 1
- **Adults RRL**: 0 mSv
- **Pediatric RRL**: 0 mSv
- **References**: 40 (16786321), 42 (25911713), 44 (21982460), 45 (23412237), 46 (25916746), 47 (29466145), 48 (28343806), 49 (27145775)
- **Study Quality**: 4

### Variant 5: Skeletally immature child. Fall or acute twisting trauma to the knee. No fracture seen on radiographs. Suspect occult fracture or internal derangement. Next study.

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CT knee without IV contrast

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| 15 (28214478)                        | 4                       |        |             |                        |    |    |    |    |    |    |    |    |    |    |    |    |    |
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### Variant 6:

Adult or child 5 years of age or older. Fall or acute twisting trauma to the knee. Tibial plateau fracture on radiographs. Suspect additional bone or soft-tissue injury. Next study.

### Procedure: MRI knee without IV contrast

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Variant 7: Adult or child 5 years of age or older. Acute trauma to the knee. Mechanism unknown. Focal patellar tenderness, effusion, able to walk. Initial imaging.
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### MRI knee without IV contrast

**Procedure:** MRI knee without IV contrast  
**Appropriateness Category:** Usually not appropriate  
**SOE:** Limited  
**Radiation Dose:** 0 mSv  
**References:**  
- 53 (8517287)  
- 54 (20063162)  
- 55 (17056925)

### MRI knee without and with IV contrast

**Procedure:** MRI knee without and with IV contrast  
**Appropriateness Category:** Usually not appropriate  
**SOE:** Limited  
**Radiation Dose:** 0 mSv  
**References:**  
- 53 (8517287)  
- 54 (20063162)  
- 55 (17056925)

### US knee

**Procedure:** US knee  
**Appropriateness Category:** Usually not appropriate  
**SOE:** Expert Consensus  
**Radiation Dose:** 0 mSv  
**References:**  
- 53 (8517287)  
- 54 (20063162)  
- 55 (17056925)

### Bone scan with SPECT or SPECT/CT knee

**Procedure:** Bone scan with SPECT or SPECT/CT knee  
**Appropriateness Category:** Usually not appropriate  
**SOE:** Expert Consensus  
**Radiation Dose:** 1-10 mSv  
**References:**  
- 53 (8517287)  
- 54 (20063162)  
- 55 (17056925)

### Variant 8: Adult or child 5 years of age or older. Acute trauma to the knee. Mechanism unknown. Focal patellar tenderness, effusion, able to walk. Initial imaging.

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<th>Peds RRL</th>
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References:
- 53 (8517287) Study Quality: 4
- 54 (20063162) Study Quality: 2
- 55 (17056925) Study Quality: 4
### Variant 9: Adult or child 5 years of age or older. Significant trauma to the knee (e.g., motor vehicle accident, knee dislocation). Initial imaging.

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**Final Tabulations**

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- 3 (1574123)
- 10 (8594242)
- 58 (21156317)
- 59 (17869471)
- 60 (16498092)
- 12 (16392612)
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**Notes:**
- **(mmSv)**: milliSieverts
- **[ped]**: pediatric dose
- **Study Quality**: 1 (poor) to 4 (excellent)
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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).