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

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

CT knee without IV contrast

Usually not appropriate  
Expert Consensus ☢ <0.1 mSv ☢ ☢ 0.03-0.3 mSv [ped]  
1 1 15 1 1 0 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 17 0 0 0 0 0 0 0 0
### MRA knee without IV contrast
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### MRA knee without and with IV contrast
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### MR arthrography knee
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### MRI knee without IV contrast
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### MRI knee without and with IV contrast
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### US knee
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 0 mSv
- Median: 1

### Bone scan with SPECT or SPECT/CT knee
- Usually not appropriate
- Expert Consensus
- Radiation Exposure: 1-10 mSv
- Median: 1

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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.

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Variant 3: Adult or skeletally mature 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

| May be appropriate | Strong | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 6 | 6 | 0 | 0 | 0 | 0 | 3 | 6 | 2 | 1 | 5 |

CT knee with IV contrast

| Usually not appropriate | Strong | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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**US knee**

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

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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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## CT knee with IV contrast

| Usually not appropriate | Strong | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|------------------------|-------|------------|------------------------|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
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| 17 (20551186)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 26 (16861540)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 21 (23677359)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 12 (16392612)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 50 (22965381)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 16 (23020888)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 51 (28190582)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 34 (28680889)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 32 (28432395)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 33 (28424850)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 29 (27775896)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 31 (28293698)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 15 (28214478)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 27 (27097792)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 28 (27177438)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 18 (25816992)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |

## CT knee without and with IV contrast

<p>| Usually not appropriate | Strong | ☢ &lt;0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|------------------------|-------|------------|------------------------|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 14 (26025120)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 17 (20551186)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 26 (16861540)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 21 (23677359)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 12 (16392612)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 50 (22965381)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 16 (23020888)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 51 (28190582)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 34 (28680889)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 32 (28432395)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 33 (28424850)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 29 (27775896)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 31 (28293698)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 15 (28214478)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 27 (27097792)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 28 (27177438)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |
| 18 (25816992)          |       |            |                        |   |   |    |   |   |   |   |   |   |   |   |   |   |   |</p>
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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

| May be appropriate | Strong | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 5 | 8 | 0 | 0 | 0 | 1 | 0 | 2 | 5 | 1 | 8 |
|-------------------|--------|------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| ☢☢ | 0.03-0.3 mSv [ped] | 5 | 8 | 0 | 0 | 0 | 1 | 0 | 2 | 5 | 1 | 8 |
| CT knee with IV contrast | Usually not appropriate | Strong | ☢ <0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|-------------------------|------------------------|--------|-------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| References              | Study Quality          |        |             |                        |   |   | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 (26025120)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 17 (20551186)           | 1                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 26 (16861540)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 21 (23677359)           | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 12 (16392612)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 50 (22965381)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 16 (23020888)           | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 51 (28190582)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 34 (28680889)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 32 (28432395)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 33 (28424850)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 29 (27775896)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 31 (28293698)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 15 (28214478)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 27 (27097792)           | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 28 (27177438)           | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |
| 18 (25816992)           | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |

<p>| CT knee without and with IV contrast | Usually not appropriate | Strong | ☢ &lt;0.1 mSv | ☢☢ 0.03-0.3 mSv [ped] | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|--------------------------------------|------------------------|--------|-------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| References                           | Study Quality          |        |             |                        |   |   | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 (26025120)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 17 (20551186)                        | 1                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 26 (16861540)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 21 (23677359)                        | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 12 (16392612)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 50 (22965381)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 16 (23020888)                        | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 51 (28190582)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 34 (28680889)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 32 (28432395)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 33 (28424850)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 29 (27775896)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 31 (28293698)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 15 (28214478)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 27 (27097792)                        | 4                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 28 (27177438)                        | 3                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |
| 18 (25816992)                        | 2                      |        |             |                        |   |   |     |   |   |   |   |   |   |   |   |   |   |   |</p>
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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.

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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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### Variant 8: Adult or child 5 years of age or older. Significant trauma to the knee (eg, motor vehicle accident, knee dislocation). Initial imaging.

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**MRI knee without IV contrast**

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- Limited
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**MRI knee without and with IV contrast**

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

- Usually not appropriate
- Expert Consensus
- O 0 mSv
- O 0 mSv [ped]
- 1
- n/a
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**Bone scan with SPECT or SPECT/CT knee**

- Usually not appropriate
- Expert Consensus
- ☢☢☢ 1-10 mSv
- ☢☢☢☢ 3-10 mSv [ped]
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CT knee with IV contrast
- 58 (21156317)
- 59 (17869471)
- 60 (16498092)

CT knee without IV contrast
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Arteriography lower extremity
- 12 (16392612)

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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).