**American College of Radiology**  
**ACR Appropriateness Criteria®**

**Osteonecrosis of the Hip**

**Variant 1:** Adult or Child. Clinically suspected osteonecrosis. First study.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
<th>Median</th>
<th>Final Tabulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiography pelvis and hips</td>
<td>Usually appropriate</td>
<td>9</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
<td>9</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT hips with IV contrast</td>
<td>Usually not appropriate</td>
<td>1</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT hips without IV contrast</td>
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<td>1</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>CT hips without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>1</td>
<td>☢☢☢☢ 10-30 mSv</td>
<td>☢☢☢☢ 10-30 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI hips without IV contrast</td>
<td>Usually not appropriate</td>
<td>1</td>
<td>0 0 mSv</td>
<td>0 0 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>MRI hips without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>1</td>
<td>0 0 mSv</td>
<td>0 0 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Tc-99m bone scan with SPECT hips</td>
<td>Usually not appropriate</td>
<td>1</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢☢ 3-10 mSv [ped]</td>
<td>1</td>
<td>n/a</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

**Variant 2:** Adult. Clinically suspected osteonecrosis. Normal radiographs or radiographs that show femoral head lucencies suspicious for osteonecrosis.
### MRI hips without IV contrast
- **SOE:** Usually appropriate
- **Adults RRL:** 0 mSv
- **Peds RRL:** 0 mSv [ped]
- **Rating:** 9
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### MRI hips without and with IV contrast
- **SOE:** May be appropriate
- **Adults RRL:** 0 mSv
- **Peds RRL:** 0 mSv [ped]
- **Rating:** 5
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### CT hips without IV contrast
- **SOE:** May be appropriate
- **Adults RRL:** 1-10 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 5
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### CT hips without and with IV contrast
- **SOE:** Usually not appropriate
- **Adults RRL:** 10-30 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 1
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### CT hips with IV contrast
- **SOE:** Usually not appropriate
- **Adults RRL:** 1-10 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 1
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### Tc-99m bone scan with SPECT hips
- **SOE:** May be appropriate
- **Adults RRL:** 1-10 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 4
- **Median:** n/a
- **Final Tabulations:**
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  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0


### Tc-99m bone scan with SPECT hips
- **SOE:** Usually not appropriate
- **Adults RRL:** 1-10 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 1
- **Median:** n/a
- **Final Tabulations:**
  - 1: 0
  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### MRI hips without IV contrast
- **SOE:** Usually appropriate
- **Adults RRL:** 0 mSv
- **Peds RRL:** 0 mSv [ped]
- **Rating:** 8
- **Median:** n/a
- **Final Tabulations:**
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  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### MRI hips without and with IV contrast
- **SOE:** Usually appropriate
- **Adults RRL:** 0 mSv
- **Peds RRL:** 0 mSv [ped]
- **Rating:** 8
- **Median:** n/a
- **Final Tabulations:**
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  - 2: 0
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  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0

### CT hips without IV contrast
- **SOE:** Usually not appropriate
- **Adults RRL:** 1-10 mSv
- **Peds RRL:** 3-10 mSv [ped]
- **Rating:** 1
- **Median:** n/a
- **Final Tabulations:**
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  - 2: 0
  - 3: 0
  - 4: 0
  - 5: 0
  - 6: 0
  - 7: 0
  - 8: 0
  - 9: 0
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<tr>
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<th>Adults RRL</th>
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<td>1-10 mSv</td>
<td>3-10 mSv</td>
<td>3</td>
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<td>Usually appropriate</td>
<td></td>
<td>0 mSv</td>
<td>0 mSv</td>
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<td>CT hips without IV contrast</td>
<td>Usually appropriate</td>
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<td>1-10 mSv</td>
<td>3-10 mSv</td>
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<td>1-10 mSv</td>
<td>3-10 mSv</td>
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<td>n/a</td>
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</table>

**Variant 4:** Adult. Osteonecrosis with femoral head collapse by radiographs in the painful hip(s). Surgery contemplated.

**Variant 5:** Child. Osteonecrosis with femoral head collapse by radiographs in the painful hip(s). Surgery contemplated.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>SOE</th>
<th>Adults RRL</th>
<th>Peds RRL</th>
<th>Rating</th>
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<tr>
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<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>3</td>
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<tr>
<td>MRI hips without IV contrast</td>
<td>Usually appropriate</td>
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<td>O 0 mSv [ped]</td>
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<td>Usually appropriate</td>
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<td>7</td>
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<tr>
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<td>Usually not appropriate</td>
<td>☢☢☢ 1-10 mSv</td>
<td>☢☢☢ 3-10 mSv [ped]</td>
<td>1</td>
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</table>

Variant 6:  Adult or child. Osteonecrosis clinically suspected. Radiographs normal or abnormal but MRI contraindicated. Further evaluation is needed.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Usual Appropriateness</th>
<th>1-10 mSv</th>
<th>3-10 mSv (ped)</th>
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<tbody>
<tr>
<td>Tc-99m bone scan with SPECT hips</td>
<td>Usually appropriate</td>
<td></td>
<td></td>
<td>8</td>
<td>n/a</td>
<td>0</td>
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</tr>
</tbody>
</table>
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.