American College of Radiology
ACR Appropriateness Criteria®

Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot)

Variant 1: Suspected osteomyelitis or septic arthritis or soft tissue infection (excluding spine and diabetic foot). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography area of interest	Usually appropriate	Limited	Varies	Varies	9	9	0	0	0	0	0	0	0	0	14
US area of interest	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	7	2	3	1	1	0	0	0	0
CT area of interest with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	10	0	2	1	1	0	0	0	0
CT area of interest without IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	10	1	2	0	1	0	0	0	0
CT area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	10	3	1	0	0	0	0	0	0
MRI area of interest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	3	0	0	1	0	0	0
MRI area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	2	1	0	1	0	0	0

References	Study Quality
6 (28366223)	4
5 (28483044)	4
2 (27726741)	4

3-phase bone scan area of interest	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0

Variant 2: Suspected septic arthritis or soft tissue infection. Initial radiographs normal or with findings suggestive of joint effusion or soft tissue swelling. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	1	0	4	4	5
References			Study Quality												
6 (28366223)			4												
2 (27726741)			4												
12 (22884398)			4												
13 (34145466)			4												
Image-guided aspiration area of interest	Usually appropriate	Limited	Varies	Varies	8	8	0	0	0	2	3	1	0	3	5
References			Study Quality												
10 (24293800)			4												
8 (32783556)			4												
9 (31128740)			4												
CT area of interest with IV contrast	Usually appropriate	Limited	Varies	Varies	7	7	0	0	0	0	2	5	4	2	1
References			Study Quality												
11 (18025514)			4												
4 (-3194802)			4												
MRI area of interest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	1	1	3	6	2	1
References			Study Quality												
6 (28366223)			4												
2 (27726741)			4												

		12 (22884398)		4												
		13 (34145466)		4												
US area of interest	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	3	5	2	1
		References		Study Quality												
		14 (22871216)		2												
CT area of interest without IV contrast	May be appropriate	Limited	Varies	Varies	5	5	1	0	0	4	6	3	0	0	0
		References		Study Quality												
		11 (18025514)		4												
		4 (-3194802)		4												
3-phase bone scan area of interest	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	5	0	3	4	1	1	0	0	0
		References		Study Quality												
		7 (27390160)		4												
		4 (-3194802)		4												
CT area of interest without and with IV contrast	Usually not appropriate	Limited	Varies	Varies	1	1	8	2	4	0	0	0	0	0	0
		References		Study Quality												
		11 (18025514)		4												
		4 (-3194802)		4												

Variant 3: Suspected osteomyelitis. Initial radiographs normal or with findings suggestive of osteomyelitis. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	2	3	9
		References		Study Quality											
		24 (17885058)		3											

		27 (20180105)	3												
		23 (16037509)	3												
		26 (19098186)	3												
		25 (23164978)	4												
		13 (34145466)	4												
MRI area of interest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	1	0	3	6	4
		References	Study Quality												
		24 (17885058)	3												
		27 (20180105)	3												
		23 (16037509)	3												
		26 (19098186)	3												
		25 (23164978)	4												
		13 (34145466)	4												
CT area of interest with IV contrast	May be appropriate	Limited	Varies	Varies	5	5	1	0	2	1	4	6	0	0	0
		References	Study Quality												
		11 (18025514)	4												
CT area of interest without IV contrast	May be appropriate	Limited	Varies	Varies	5	5	0	1	3	2	5	2	1	0	0
		References	Study Quality												
		11 (18025514)	4												
FDG-PET/CT area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv		5	5	0	0	0	3	11	0	0	0	0
		References	Study Quality												
		20 (23905618)	4												
		17 (21934545)	M												
		18 (26897336)	4												
		22 (26547722)	2												
		21 (28451827)	4												
		15 (30675635)	4												

WBC scan and sulfur colloid scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	0	0	1	4	9	0	0	0	0

References	Study Quality
18 (26897336)	4
16 (27742026)	4
15 (30675635)	4

3-phase bone scan and WBC scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	0	1	0	1	9	3	0	0	0

References	Study Quality
17 (21934545)	M

3-phase bone scan and WBC scan and sulfur colloid scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	5	5	0	0	1	2	10	1	0	0	0

References	Study Quality
16 (27742026)	4
15 (30675635)	4

3-phase bone scan area of interest	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	1	7	6	0	0	0	0

References	Study Quality
19 (17146681)	3
17 (21934545)	M
18 (26897336)	4

WBC scan area of interest	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	3	2	3	3	2	1	0	0	0

References	Study Quality
17 (21934545)	M
21 (28451827)	4
15 (30675635)	4

CT area of interest without and with IV contrast	Usually not appropriate	Limited	Varies	Varies	2	2	7	1	4	0	1	1	0	0	0
	References		Study Quality												
	11 (18025514)		4												
US area of interest	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	7	2	2	1	2	0	0	0	0
	References		Study Quality												
	28 (19082589)		3												

Variant 4: Suspected osteomyelitis or soft tissue infection with implanted extra-articular surgical hardware. Initial radiographs normal or with findings suggestive of osteomyelitis or soft tissue infection with implanted extra-articular surgical hardware. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	1	2	5	6
	References		Study Quality												
	27 (20180105)		3												
	32 (19255815)		4												
	31 (30683987)		4												
	21 (28451827)		4												
MRI area of interest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	5	0	5	3	1
	References		Study Quality												
	27 (20180105)		3												
	32 (19255815)		4												
	31 (30683987)		4												
	21 (28451827)		4												
CT area of interest with IV contrast	May be appropriate	Limited	Varies	Varies	6	6	0	0	0	0	7	6	1	0	0

		References		Study Quality											
		29 (16759307)		3											
		22 (26547722)		2											
		21 (28451827)		4											
CT area of interest without IV contrast	May be appropriate	Limited	Varies	Varies	5	5	0	0	1	0	13	0	0	0	0
		References		Study Quality											
		29 (16759307)		3											
		22 (26547722)		2											
		21 (28451827)		4											
FDG-PET/CT area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv		5	5	0	0	0	3	11	0	0	0	0
		References		Study Quality											
		30 (17136411)		3											
		22 (26547722)		2											
		21 (28451827)		4											
US area of interest	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	2	2	2	5	1	0	0	1
		References		Study Quality											
		33 (14749963)		4											
		28 (19082589)		3											
WBC scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	2	7	5	0	0	0	0
		References		Study Quality											
		21 (28451827)		4											
WBC scan and sulfur colloid scan area of interest	May be appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	1	7	6	0	0	0	0
3-phase bone scan and WBC scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	4	1	2	3	3	0	0	0	1
		References		Study Quality											

		21 (28451827)		4												
3-phase bone scan area of interest	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	5	1	3	2	2	0	1	0	0
		References		Study Quality												
		19 (17146681)		3												
		17 (21934545)		M												
		21 (28451827)		4												
CT area of interest without and with IV contrast	Usually not appropriate	Limited	Varies	Varies	1	1	8	3	3	0	0	0	0	0	0
		References		Study Quality												
		29 (16759307)		3												
		22 (26547722)		2												
		21 (28451827)		4												
3-phase bone scan and WBC scan and sulfur colloid scan area of interest	Usually not appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	8	1	2	1	0	1	0	1	0
Image-guided aspiration area of interest	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	9	2	3	0	0	0	0	0	0

Variant 5: Suspected septic arthritis with arthroplasty or other implanted intra-articular surgical hardware. Initial radiographs normal or with findings suggestive of septic arthritis with arthroplasty or other implanted intra-articular surgical hardware. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Image-guided aspiration area of interest	Usually appropriate	Limited	Varies	Varies	9	9	0	0	1	1	0	0	0	2	10
		References		Study Quality											
		31 (30683987)		4											
		39 (28932957)		3											
		38 (31056444)		2											

MRI area of interest without and with IV contrast	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	2	2	7	3

References	Study Quality
41 (14684523)	3
43 (19132424)	4
32 (19255815)	4
42 (31642691)	1
21 (28451827)	4

CT area of interest with IV contrast	Usually appropriate	Limited	Varies	Varies	7	7	0	0	1	0	3	3	5	2	0

References	Study Quality
11 (18025514)	4
31 (30683987)	4
21 (28451827)	4

MRI area of interest without IV contrast	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	1	6	4	0

References	Study Quality
41 (14684523)	3
43 (19132424)	4
32 (19255815)	4
42 (31642691)	1
21 (28451827)	4

CT area of interest without IV contrast	May be appropriate	Limited	Varies	Varies	5	5	0	0	0	2	10	2	0	0	0

References	Study Quality
11 (18025514)	4
31 (30683987)	4
21 (28451827)	4

US area of interest	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	5	9	0	0	0	0

References	Study Quality

		33 (14749963)			4											
		28 (19082589)			3											
FDG-PET/CT area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv		4	4	4	0	3	2	4	0	1	0	0
		References			Study Quality											
		36 (27707850)			Inadequate											
		40 (31365498)			4											
WBC scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	2	6	6	0	0	0	0
		References			Study Quality											
		45 (19958846)			4											
		34 (26706230)			3											
		36 (27707850)			Inadequate											
WBC scan and sulfur colloid scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	1	8	5	0	0	0	0
		References			Study Quality											
		36 (27707850)			Inadequate											
		44 (28555449)			3											
3-phase bone scan and WBC scan area of interest	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	5	0	1	3	4	0	0	0	1
		References			Study Quality											
		34 (26706230)			3											
3-phase bone scan and WBC scan and sulfur colloid scan area of interest	Usually not appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	2	7	2	0	2	1	1	0	1	0
CT area of interest without and with IV contrast	Usually not appropriate	Limited	Varies	Varies	1	1	10	3	1	0	0	0	0	0	0
		References			Study Quality											
		11 (18025514)			4											
		31 (30683987)			4											

		21 (28451827)		4											
3-phase bone scan area of interest	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	8	0	4	2	0	0	0	0	0
		References		Study Quality											
		34 (26706230)		3											
		36 (27707850)		Inadequate											
		35 (28969761)		4											
		37 (30888518)		3											

Variant 6: Suspected soft tissue infection. History of puncture wound with possible retained foreign body. Radiographs normal. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US area of interest	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	1	0	0	1	5	7
		References		Study Quality											
		47 (24951233)		4											
		46 (33136481)		4											
		48 (29426979)		2											
CT area of interest with IV contrast	Usually appropriate	Limited	Varies	Varies	7	7	0	0	0	0	3	2	4	1	4
		References		Study Quality											
		47 (24951233)		4											
		46 (33136481)		4											
CT area of interest without IV contrast	Usually appropriate	Limited	Varies	Varies	7	7	0	0	0	0	3	1	7	1	2
		References		Study Quality											
		47 (24951233)		4											
		46 (33136481)		4											

CT area of interest without and with IV contrast	Usually appropriate	Limited	Varies	Varies	7	7	0	0	1	1	4	1	5	1	1

References	Study Quality
47 (24951233)	4
46 (33136481)	4

MRI area of interest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	2	3	2	4	3	0

References	Study Quality
47 (24951233)	4
46 (33136481)	4

MRI area of interest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	2	5	3	1

References	Study Quality
47 (24951233)	4
46 (33136481)	4

Variant 7: Suspected soft tissue infection. Initial radiographs show soft tissue gas (without puncture wound) or are normal with high clinical suspicion of necrotizing fasciitis. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT area of interest without IV contrast	Usually appropriate	Moderate	Varies	Varies	9	9	0	0	0	0	0	1	3	3	7

References	Study Quality
6 (28366223)	4
51 (26286006)	3
49 (25539248)	4
52 (29537292)	4
2 (27726741)	4
54 (29672405)	Good

		53 (9169717)	4												
		55 (29211672)	4												
CT area of interest with IV contrast	Usually appropriate	Moderate	Varies	Varies	8	8	0	0	0	0	0	3	4	2	5
		References	Study Quality												
		6 (28366223)	4												
		51 (26286006)	3												
		49 (25539248)	4												
		52 (29537292)	4												
		2 (27726741)	4												
		54 (29672405)	Good												
		53 (9169717)	4												
		55 (29211672)	4												
MRI area of interest without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	7	4	3
		References	Study Quality												
		50 (30887193)	2												
		49 (25539248)	4												
		52 (29537292)	4												
		2 (27726741)	4												
		54 (29672405)	Good												
		56 (21406630)	3												
		57 (23043899)	4												
		58 (9490940)	3												
MRI area of interest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	2	8	4
		References	Study Quality												
		50 (30887193)	2												
		49 (25539248)	4												
		52 (29537292)	4												
		2 (27726741)	4												

US area of interest	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	1	13	0	0	0	0
CT area of interest without and with IV contrast	Usually not appropriate	Moderate	Varies	Varies	1	1	12	1	1	0	0	0	0	0	0

References	Study Quality
54 (29672405)	Good
56 (21406630)	3
57 (23043899)	4
58 (9490940)	3

References	Study Quality
60 (31031033)	3
52 (29537292)	4
57 (23043899)	4
59 (-3194804)	4
61 (24578776)	4
62 (21480291)	4

References	Study Quality
6 (28366223)	4
51 (26286006)	3
49 (25539248)	4
52 (29537292)	4
2 (27726741)	4
54 (29672405)	Good
53 (9169717)	4
55 (29211672)	4

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.**