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.

Day on James	Appropriateness	SOF	A J., 14., DD	I D. J. DDI	D - 45	M - 1!			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RR	L Peds RRL	Rating	Median	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
		References		Study	Quality										
		6 (28366223)			4										
		5 (28483044)			4										
		2 (27726741)			4										
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

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	
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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.

D 1	Appropriateness	COE	A L L DDI	D I DDI	D 4	N.T. 11			F	inal	Tabu	latior	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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 (22004200)			4										
			12 (22884398)			4										
			13 (34145466)			4			1			1				
US area of interest	Usua approp	ılly oriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	3	5	2	1
			References		Stud	y Quality										
			14 (22871216)			2										
CT area of interest without IV contrast	May approp	be oriate	Limited	Varies	Varies	5	5	1	0	0	4	6	3	0	0	0
			References		Stud	y Quality		•	•	•						
			11 (18025514)			4										
			4 (-3194802)			4										
3-phase bone scan area of interest	Usually approp		Limited	��� 1-10 mSv	0	3	3	5	0	3	4	1	1	0	0	0
			References		Stud	y Quality										
			7 (27390160)			4										
			4 (-3194802)			4										
CT area of interest without and with IV contrast	Usually approp		Limited	Varies	Varies	1	1	8	2	4	0	0	0	0	0	0
			References		Stud	y Quality										
		References 11 (18025514)				4										
			4 (-3194802)			4										

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

24 (17885058)

n 1	Appropri	ateness	COF	4 1 14 DD		n i nni	D 41	37.1			F	inal '	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RR	(L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI area of interest without and with IV contrast	Usua approp		Limited	O 0 mSv	′	O 0 mSv [ped]	9	9	0	0	0	0	0	0	2	3	9
			References			Study	Quality										

		27 (20180105)			3										
		23 (16037509)			3										
		26 (19098186)			3										
		25 (23164978)			4										
		13 (34145466)			4					1					
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	May be	Limited	Varies	Varies	5	5	0	1	3	2	5	2	1	0	0
contrast	appropriate					3		1	٦		3		<u> </u>		
contrast	appropriate	References		Study	Quality	3		-				_			
contrast	appropriate			Study	Quality 4	<i>J</i>		1							
FDG-PET/CT area of interest	May be appropriate	References	���� 10-30 mSv	Study		5	0	0	0	3	11	0	0	0	0
	May be	References 11 (18025514)	���� 10-30 mSv		4								0	0	0
	May be	References 11 (18025514) Limited	���� 10-30 mSv		5								0	0	0
	May be	References 11 (18025514) Limited References	���� 10-30 mSv	Study	4 5 Quality								0	0	0
	May be	References 11 (18025514) Limited References 20 (23905618)	ବ୍ୟବ୍ୟକ 10-30 mSv	Study	4 5 Quality 4								0	0	0
	May be	References 11 (18025514) Limited References 20 (23905618) 17 (21934545)	❤️❤️❤️ 10-30 mSv	Study	4 5 Quality 4 M								0	0	0
	May be	References 11 (18025514) Limited References 20 (23905618) 17 (21934545) 18 (26897336)	≎≎≎≎ 10-30 mSv	Study	4 5 Quality 4 M 4								0	0	0

WBC scan and sulfur colloid scan area of interest	May be appropriate	Limited	���� 10-3 mSv	30	5	5	0	0	1	4	9	0	0	0	0
		References		Stud	y Quality										
		18 (26897336)			4										
		16 (27742026)			4										
		15 (30675635)			4										
3-phase bone scan and WBC scan area of interest	May be appropriate	Limited	���� 10-3 mSv	30	5	5	0	1	0	1	9	3	0	0	0
		References		Stud	y Quality										
		17 (21934545)			M]								
3-phase bone scan and WBC scan and sulfur colloid scan area of interest	May be appropriate	Limited	���� 10-3 mSv	30	5	5	0	0	1	2	10	1	0	0	0
		References		Stud	y 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		Stud	y Quality										
		19 (17146681)			3										
		17 (21934545)	l .		M]								
		18 (26897336)			4										
WBC scan area of interest	Usually not appropriate	Limited	���� 10-3 mSv	30	3	3	3	2	3	3	2	1	0	0	0
		References		Stud	y Quality										
		17 (21934545)			M]								
		21 (28451827)			4]								
		15 (30675635)			4]								

CT area of interest without and with IV contrast	Usuall approp	Limited	Varies		Varies	2	2	7	1	4	0	1	1	0	0	0
		References			Study	Quality										
		11 (18025514)			4											
US area of interest	Usuall approp	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.

D 1	Appropriateness	COF	A L L DDI	, D. I. DDI	D 4	N. 11			F	inal '	Tabu	latio	ıs		
Procedure	Category	SOE	Adults RRI	L Peds RRL	Rating	Median	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

	г																
		References 29 (16759307) 22 (26547722)				Study	Quality										
			, ,				3										
	_		22 (26547722)				2										
			21 (28451827)				4				1	1					
CT area of interest without IV contrast	May appropri		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 appropr		Limited	���� 10- mSv	30		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 appropr		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 appropri		Limited	���� 10- mSv	30	���� 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 appropr		Expert Consensus	≎≎≎≎ 10- mSv	30	���� 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 appropri		Limited	���� 10- mSv	30	≎≎≎≎ 3- 10 mSv [ped]	4	4	4	1	2	3	3	0	0	0	1
		References				a	Quality										

			21 (28451827)				4										
3-phase bone scan area of interest	Usuall approp		Limited	≎≎≎ 1-10 mSv	10	≎≎ 3- mSv ped]	3	3	5	1	3	2	2	0	1	0	0
			References			Study	Quality										
			19 (17146681)				3										
			17 (21934545) 21 (28451827)				M										
			21 (28451827)				4										
CT area of interest without and with IV contrast	Usuall approp		Limited	Varies	Va	aries	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	Usuall approp		Expert Consensus	���� 10-3 mSv	30 10 m	9999 0-30 nSv ped]	1	1	8	1	2	1	0	1	0	1	0
Image-guided aspiration area of interest	Usuall	y not	Expert	Varies		aries	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.

D 1	Appropri	iateness	COE	4 1 14 DD	· T	D I DDI	D 41	24.11			F	inal '	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Image-guided aspiration area of interest	Usua approp	.*	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)

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										

	Γ															
		33 (14749963)				4										
		28 (19082589)				3			1	1		1				
FDG-PET/CT area of interest	May lappropi	Limited	���� 10-3 mSv	30		4	4	4	0	3	2	4	0	1	0	0
		References			Study	Quality										
		36 (27707850)			Inac	lequate										
		40 (31365498)				4										
WBC scan area of interest	May lappropi	Limited	≎≎≎≎ 10-3 mSv	80	���� 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)			Inac	lequate										
WBC scan and sulfur colloid scan area of interest	May lappropi	Limited	≎≎≎≎ 10-3 mSv	30	���� 3- 10 mSv [ped]	4	4	0	0	1	8	5	0	0	0	0
		References			Study	Quality										
		36 (27707850)			Inac	lequate										
		44 (28555449)				3										
3-phase bone scan and WBC scan area of interest	May appropr	Limited	≎≎≎≎ 10-3 mSv	80	���� 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 appropi	Expert Consensus	���� 10-3 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 appropi	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	Usuall approp	y not oriate	Limited	��� 1-10 mSv) 10 r	֎ 3- mSv ed]	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.

D 1	Appropri	iateness	COF	41 L DD		. I DDI	D 4	3.6.11			F	inal	Tabu	latio	ıs		
Procedure	Categ	gory	SOE	Adults RR	IL P	eds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US area of interest	Usua approp		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	Usua approp		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	Usua approp		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		Stu	dy 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		Stud	dy Quality										
		47 (24951233)			4										
		46 (33136481)													
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		Stud	dy Quality										
		47 (24951233)													
		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.

Appropria	ateness	SOF	A J14- DD	r D. J. DDI	D - 45	Madian			F	inal	Tabu	llatio	ns		
		SOE	Adults RR	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
	.5	Moderate	Varies	Varies	9	9	0	0	0	0	0	1	3	3	7
		References		Stud	ly Quality										
	Catego	Appropriateness Category Usually appropriate	Usually appropriate Moderate	Usually appropriate Moderate Varies	Usually appropriate Moderate Varies Varies	Usually appropriate Moderate Varies Varies 9	Usually appropriate Moderate Varies Varies Varies 9 9	Category Usually appropriate Moderate Varies Varies Varies Varies Varies 9 9 0	Category Usually appropriate Moderate Varies Varies Varies Rating Median 1 2 0 0	Category SOE Adults RRL Peds RRL Rating Median 1 2 3 Usually appropriate Varies Varies 9 9 0 0 0	Category SOE Adults RRL Peds RRL Rating Median 1 2 3 4 Usually appropriate Varies Varies 9 9 0 0 0 0	Category SOE Adults RRL Peds RRL Rating Median 1 2 3 4 5 Usually appropriate Varies Varies 9 9 0 0 0 0 0 0	Category SOE Adults RRL Peds RRL Rating Median 1 2 3 4 5 6 Usually appropriate Varies 9 9 0 0 0 0 0 1	Category SOE Addits RRL Feds RRL Rating Median 1 2 3 4 5 6 7 Usually appropriate Varies Varies 9 9 0 0 0 0 0 1 3	SOE Adults RRL Peds RRL Rating Median 1 2 3 4 5 6 7 8

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										

		54 (29672405)			Good										
		56 (21406630)			3										
		57 (23043899)			4										
		58 (9490940)			3										
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
		References		Study	Quality		-								
		60 (31031033)			3										
		52 (29537292)			4										
		57 (23043899)			4										
		59 (-3194804)			4										
		61 (24578776)			4										
		62 (21480291)			4										
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										
		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.