American College of Radiology ACR Appropriateness Criteria®

Acute Hand and Wrist Trauma

Variant 1: Acute blunt or penetrating trauma to the hand or wrist. Initial imaging.

	Annronria	riateness gory SOE Adults RRL Peds RRL Rating Median								F	inal '	Tabu	latio	ns			
Procedure	Catego	ory	SOE	Adults RRI	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography area of interest	Usual appropr		Limited	Varies		Varies	9	9	0	0	0	0	0	0	1	0	13
			References			Study	Quality										
			11 (9167669)				4										
			13 (10350289)				3										
			14 (14573411)				3										
			15 (8430556)				4										
			16 (23047281)				4										
			17 (25455403)				4		_								
CT area of interest with IV contrast	Usually appropr		Expert Consensus	Varies		Varies	1	1	12	0	0	0	1	1	0	0	0
CT area of interest without IV contrast	Usually appropr		Strong	Varies		Varies	1	1	12	0	1	1	0	0	0	0	0
			References		•	Study	Quality										
			7 (9330135)				2										
			9 (9728159)				4										
			10 (11279570)				4										
			8 (16757766)				2		_								
CT area of interest without and with IV contrast	Usually appropr		Expert Consensus	Varies		Varies	1	1	12	0	0	0	1	0	0	1	0

MRI area of interest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	1	0	0	0	1	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	12	0	1	0	0	0	1	0	0
Bone scan area of interest	Usually not appropriate	Expert Consensus	≎≎≎ 1-10 mSv		1	1	13	0	1	0	0	0	0	0	0
US area of interest	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	3	0	0	0	0	0	0	0

Variant 2: Suspect acute hand or wrist trauma. Initial radiographs negative or equivocal. Next imaging study.

	Appropriatene	SS GOT							I	inal	Tabu	latio	ns		
Procedure	Category	SOE SOE	Adults RR	L Peds RRI	Rating	Median	1	2	3	4	5	6	7	8	9
MRI area of interest without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	1	0	4	7	2
		References		Str	ıdy Quality										
		23 (15618379)			2										
		25 (14600775)			3										
		24 (16118171)			1										
		26 (15232430)			4										
		27 (9638833)			4										
		12 (12594566)			3										
		22 (24651285)			4	_									
Radiography area of interest repeat in 10-14 days	Usually appropriate	Limited	Varies	Varies	8	8	0	0	0	0	3	0	4	4	3
		References		Str	ıdy Quality										
		13 (10350289)			3			_		_	_				
CT area of interest without IV contrast	Usually appropriate	Strong	Varies	Varies	7	7	1	0	0	0	1	0	7	0	5
		References	Str	dy Quality											

7 (9330135)	2
8 (16757766)	2
18 (15290486)	4
19 (25455395)	4
21 (14623677)	4
22 (24651285)	4
20 (20385675)	4

CT area of interest with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	11	2	1	0	0	0	0	0	0
CT area of interest without and with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	11	0	1	0	0	2	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	1	0	1	1	1	0	0
Bone scan area of interest	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	10	0	0	0	3	0	0	0	1
US area of interest	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	8	1	4	0	1	0	0	0	0

References	Study Quality
28 (1806504)	3
29 (11959740)	3

Variant 3: Acute wrist fracture on radiographs. Suspect wrist tendon or ligament trauma. Next imaging study.

Donal James	Appropriateness	COF	A L L DDI	D I DDI	D 41	3.7.11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MR arthrography wrist	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	2	0	2	2	8

References	Study Quality
33 (17449771)	1
46 (10194719)	2

		37 (20467868)			4										
		47 (14610703)			2										
		48 (11584224)			2										
		45 (12773676)			3										
MRI wrist without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	2	4	7
		References		Study	y Quality										
		40 (18762112)			2										
		41 (19098183)			2										
		43 (20012039)			4										
		36 (22959873)			3										
		38 (22582365)			4										
		39 (11162698)			4										
		44 (27726753)			4										
		37 (20467868)			4										
		35 (16508768)			4										
		42 (24436792)			2			ı	1			1		-	
CT arthrography wrist	Usually appropriate	Strong	⊕ <0.1 mSv		7	7	0	0	0	0	4	0	6	4	0
		References		Study	y Quality										
		32 (18480484)			4										
		33 (17449771)			1										
		34 (17606063)			2										
		36 (22959873)			3										
		37 (20467868)			4										
		35 (16508768)			4			1	1						
US wrist	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	0	0	5	1	5	1	1
		References		Study	y Quality										
		50 (21078815)			4										
		53 (18204008)			3										

49 (16010593)	4
44 (27726753)	4
51 (15252095)	2
52 (14574517)	3

CT wrist with IV contrast	Usually not appropriate	Expert Consensus	≎ <0.1 mSv		1	1	11	0	1	0	0	1	1	0	0
CT wrist without IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv		1	1	12	0	0	0	0	1	1	0	0
CT wrist without and with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv		1	1	12	0	0	0	0	2	0	0	0
MRI wrist without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	0	0	2	1	0	0	1
Bone scan wrist	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	12	1	1	0	0	0	0	0	0

Variant 4: Initial radiographs showing distal radioulnar joint or carpal malalignment in the absence of fracture. Next imaging study.

D 1	Appropri	ateness	SOE Adults RRL		. T	D I DDI	D 41	3.7.11			F	inal '	Tabu	latio	ns		
Procedure	Categ	ory	SOE	Adults RRL		Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT wrist without IV contrast bilateral	Usua approp		Limited	≎ <0.1 mS	Sv		9	9	1	0	0	0	1	0	2	0	9
			References			Study											
			54 (24951208)														
			55 (25148156)			4											
MRI wrist without IV contrast	Usua approp		Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	8	8	0	0	0	0	2	0	4	2	5
MR arthrography wrist	Usua approp		Limited O.0		/	O 0 mSv [ped]	7	7	0	0	0	0	3	3	1	2	4
		·	References			Study	Quality		•		•	•	•	•	•	•	
			57 (27183404)				4										

		56 (22447235)			4										
CT arthrography wrist	May be appropriate	Limited	⊕ <0.1 mSv		5	5	0	0	0	1	6	2	1	2	1
		References		Study	Quality										
		57 (27183404)	l .		4										
		56 (22447235)			4										
MRI wrist without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	0	0	0	1	0	0	0
Bone scan wrist	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	13	1	0	0	0	0	0	0	0
US wrist	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	1	1	0	1	0	1	0	0
CT wrist with IV contrast bilateral	Usually not appropriate	Limited	⊕ <0.1 mSv		1	1	12	0	0	0	0	0	1	0	0
		References		Study											
		54 (24951208)			4										
		55 (25148156)			4										
CT wrist without and with IV contrast bilateral	Usually not appropriate	Limited	⊕ <0.1 mSv		1	1	12	0	0	0	0	0	1	0	0
		References		Study	Quality										
		54 (24951208)	l .		4										
		55 (25148156)			4										

Variant 5: Acute hand fracture on radiographs. Suspect hand tendon or ligament trauma. Next imaging study.

Procedure	Appropriateness	COE	Adults RRL	D I DDI	D 41	Rating Median	Final Tabulations										
	Category	SOE		Peds RRL	Rating		1	2	3	4	5	6	7	8	9		
MRI hand without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	0	2	11		
		References		Study	Ouality												

		61 (8686601)													
		60 (7992741)			4										
		63 (8327714)			2										
		62 (7997584)			3										
		58 (9867179)			3										
		59 (27726751)													
US hand	Usually appropriate	Limited	Limited O 0 mSv		7	7	0	0	1	0	2	1	3	3	3
		References		Study											
		66 (11867797)			3										
		67 (16315116)		4											
CT hand with IV contrast	Usually not appropriate	Expert Consensus	≎ <0.1 mSv		1	1	11	0	1	0	0	1	0	0	0
CT hand without IV contrast	Usually not appropriate	Expert Consensus	� <0.1 mSv		1	1	11	0	0	0	1	1	0	0	0
CT hand without and with IV contrast	Usually not appropriate	Expert Consensus	� <0.1 mSv		1	1	12	0	0	0	0	1	0	0	0
MRI hand without and with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	1	1	11	0	0	0	1	0	0	0	1
		References		Study	y Quality					•					
		61 (8686601)			3										
		60 (7992741)			4										
		63 (8327714)			2										
		62 (7997584)			3										
		58 (9867179)			3										
		59 (27726751)			4										
Bone scan hand	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	11	2	0	0	0	0	0	0	0

Variant 6: Initial radiographs showing metacarpophalangeal, proximal interphalangeal, or distal interphalangeal joint malalignment in the absence of fracture. Next imaging study.

D	Appropriateness	COF	A L L DDI	D I DDI	D (1	3.6.31	Final Tabulations												
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9				
MRI hand without IV contrast	Usually appropriate	Limited O 0 mSv		O 0 mSv [ped]	9	9	0	0	0	0	0	1	0	1	11				
		References		Study	Quality									•					
		74 (11818612)																	
		70 (11012445)																	
		73 (8029417)																	
		69 (8623637)			4														
		58 (9867179)	58 (9867179)		3			ı	ı		ı	1	ı						
US hand	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	0	5	3	2				
		References		Study	Quality														
		16 (23047281)																	
		70 (11012445)		3															
		66 (11867797)		3															
		67 (16315116)																	
		75 (12869687)			4														
		76 (10722814)			2		1	ı	ı		ı	ı	ı						
CT hand with IV contrast	Usually not appropriate	Expert Consensus	≎ <0.1 mSv	,	1	1	12	0	0	0	0	1	0	0	0				
CT hand without IV contrast	Usually not appropriate	Expert Consensus	≎ <0.1 mSv	,	1	1	11	0	0	1	0	1	0	0	0				
CT hand without and with IV contrast	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	,	1	1	12	0	0	0	0	1	0	0	0				

MRI hand without and with IV contrast	Usuall approp		Limited O 0 mSv			O 0 mSv [ped]	1	1	11	0	0	1	0	0	0	0	1
			References			Study											
			74 (11818612)			3											
		70 (11012445)					3										
			73 (8029417)				3										
		69 (8623637)		4													
		58 (9867179)			3												
Bone scan hand	Usuall approp		Expert Consensus	��� 1-10 mSv)		1	1	12	1	0	0	0	0	0	0	0

Variant 7: Suspect penetrating trauma with a foreign body in the soft tissues in the hand or wrist. Initial radiographs are negative. Next imaging study.

Procedure	Appropriate	eness	SOE	4 1 14 DD		D I DDI	D 4	3.6 11	Final Tabulations								
Procedure	Category		S	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US area of interest	Usually appropriat	~ ^	Expert Consensus O 0 mSv		,	O 0 mSv [ped]	9	9	0	0	0	0	1	0	2	1	9
CT area of interest without IV contrast	Usually appropriat		Expert Varies		Varies	7	7	1	0	0	0	3	1	2	3	3	
MRI area of interest without IV contrast	May be appropriat			O 0 mSv		O 0 mSv [ped]	6	6	0	0	0	0	4	3	3	2	1
MRI area of interest without and with IV contrast	Usually no appropriat		ed	O 0 mSv	,	O 0 mSv [ped]	3	3	6	0	5	0	3	0	0	0	0
		Refer	rences														
		82 (276	531109)		2				-						_		
CT area of interest with IV contrast	Usually no appropriat			Varies		Varies	1	1	12	0	1	1	0	0	0	0	0
CT area of interest without and with IV contrast	Usually no appropriat		Expert Varies			Varies	1	1	11	0	0	0	0	1	1	0	0

Bone scan area of interest	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	12	1	0	0	0	0	0	0	0	
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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.