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.

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	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 not appropriate	Expert Consensus	Varies	Varies	1	1	12	0	0	0	1	1	0	0	0
CT area of interest without IV contrast	Usually not appropriate	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 not appropriate	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.

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 IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	1	0	4	7	2
		References		Study 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		Study 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		Study 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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							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 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													
CT arthrography wrist	Usually appropriate	Strong	☢ <0.1 mSv		7	7	0	0	0	0	4	0	6	4	0
		References	Study Quality													
		32 (18480484)	4													
		33 (17449771)	1													
		34 (17606063)	2													
		36 (22959873)	3													
		37 (20467868)	4													
		35 (16508768)	4													
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 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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT wrist without IV contrast bilateral	Usually appropriate	Limited	☢ <0.1 mSv		9	9	1	0	0	0	1	0	2	0	9

References	Study Quality
54 (24951208)	4
55 (25148156)	4

MRI wrist without IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	2	0	4	2	5
MR arthrography wrist	Usually appropriate	Limited	O 0 mSv	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)		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 Quality												
		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)		4												
		55 (25148156)		4												

Variant 5: Acute hand fracture on radiographs. Suspect hand tendon or ligament trauma. 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 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 Quality											

		61 (8686601)		3											
		60 (7992741)		4											
		63 (8327714)		2											
		62 (7997584)		3											
		58 (9867179)		3											
		59 (27726751)		4											
US hand	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	1	0	2	1	3	3	3
		References		Study Quality											
		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 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.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							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)	3
70 (11012445)	3
73 (8029417)	3
69 (8623637)	4
58 (9867179)	3

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)	4
70 (11012445)	3
66 (11867797)	3
67 (16315116)	4
75 (12869687)	4
76 (10722814)	2

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	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	11	0	0	1	0	0	0	0	1

References	Study Quality
74 (11818612)	3
70 (11012445)	3
73 (8029417)	3
69 (8623637)	4
58 (9867179)	3

Bone scan hand	Usually not appropriate	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	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	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 appropriate	Expert Consensus	Varies	Varies	7	7	1	0	0	0	3	1	2	3	3
MRI area of interest without IV contrast	May be appropriate	Expert Consensus	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 not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	6	0	5	0	3	0	0	0	0

References	Study Quality
82 (27631109)	2

CT area of interest with IV contrast	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	0	1	1	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	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

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.**