

TABLE E-1 Features of the Thirty-two Fractures Included in the Study*

Most Recent																		
Case	Age (Yrs.), Gender	Side	Dominant	Fracture Type	Open	F/U (Yrs.)	Pain	Extension (Degrees)	Flexion (Degrees)	Extension Before HO Resection	Flexion Before HO Resection	Brooker Stage of HO	Radiographic Findings	MEPS	MEPS Rating	Jupiter Rating	Reoperations	CPM
1	82, M	R	Yes	A3	-	1	Mild	25	125					80	G	G		No
2	67, M	R	Yes	A3	-	1	Mild	20	125					85	G	G		No
3	57, M	R	Yes	A3	-	1	No	20	135					100	E	G		No
4	69, F	L	Yes	C2	-	1	No	10	140					100	E	E	Skin flap	No
5	99, F	R	Yes	C2	-	1	No	35	90					80	G	F		No
6	65, F	L	No	C2	-	5	No	30	140					100	E	G		Yes
7	16, M	L	No	C2	-	1	No	0	150					100	E	E		Yes
8	67, M	R	Yes	C3	-	1	No	25	130					100	E	G		No
9	33, F	R	Yes	C3	-	1	Moderate	25	100	75	80	IV	HO (Severe)	55	P	F	HO resection	Yes
10	70, F	R	Yes	C3	-	1	No	50	125				HO (Mild), Collapse	85	G	P		Yes
11	41, F	R	Yes	C3	-	1	No	0	150					100	E	E		Yes
12	59, M	R	Yes	C3	-	1	Mild	20	130					85	G	G		No
13	25, M	L	No	C3	-	2	No	10	80					80	G	P	Wound débridement	No
14	79, M	R	Yes	C3	-	4	No	10	135					100	E	E		Yes
15	65, F	L	No	C3	-	5	Mild	20	120					80	G	G	Bone graft	Yes
16	58, F	R	Yes	C3	-	5	No	30	150					100	E	G		Yes
17	58, F	L	No	C3	-	5	No	50	130					85	G	P		Yes
18	59, M	R	Yes	C3	-	2	No	5	140	50	60	III	HO (Severe)	100	E	E	HO resection	Yes
19	60, F	R	Yes	C3	-	1	No	30	120					95	G	G		No
20	68, F	L	No	C3	I	1	Mild	25	130				HO (Mild)	85	G	G		Yes
21	74, M	R	Yes	C3	I	1	Mild	40	100				HO (Moderate), Collapse	75	G	F	Deep infection	Yes
22	36, F	L	Yes	C3	II	1	No	30	90					85	G	F		Yes
23	63, F	R	Yes	C3	II	1	Moderate	30	115				HO (Moderate)	65	F	F		Yes
24	63, M	L	No	C3	II	3	Mild	15	125					100	E	G		Yes
25	35, M	L	No	C3	III-A	1	Mild	5	150	50	105	III	HO (Severe)	85	G	G	HO resection	Yes
26	50, F	L	No	C3	III-A	1	Mild	25	150					85	G	G		No
27	47, M	L	Yes	C3	III-A	1	No	55	105				HO (Mild)	50	P	F	Wound débridement	No
28	54, M	R	Yes	C3	III-A III-A	1	Mild	35	125	40	120	III	HO (Severe)	75	G	F	Triceps reconstruction, resection	Yes
29	29, M	R	Yes	C3	III-A	1	Mild	50	125				HO (Mild)	75	G	P		No
30	67, M	L	Yes	C3	III-A	1	No	20	120					100	E	G		Yes
31	38, M	L	No	C3	III-A	3	Moderate	40	135	40	70	III	HO (Severe), DJD	55	P	F	HO resection, capsular release and interposition arthroplasty	No
32	44, M	L	No	C3	III-A	3	Moderate	40	120				HO (Moderate), DJD	60	F	F	Skin graft	Yes

*F/U = follow-up, HO = heterotopic ossification, CPM = continuous passive motion, DJD = degenerative joint disease.

TABLE E-2. Published reports on open reduction and internal fixation of distal humeral fractures

Study	N	Age (years), mean (range)	F/U (months), mean (range)	Fracture type (AO classification)	Open	ROM, mean (range)	Overall results	Complications	Reoperations
Jupiter et al. ⁵	34	57 (17-79)	70 (25-139)	C1 = 13, C2 = 2, C3 = 19	14 (41%)	76% achieved at least 30°-120°	79% satisfactory‡	Nonunion (2), refracture (1), olecranon osteotomy nonunion (2), class-II HO** (1), ulnar neuropathy (4), median neuropathy (1)	Hardware removal (24), capsulectomy (3), HO removal (1), nerve decompression (4)
Henley et al. ²	33	32 (15-61)	18.3	C1 = 23, C2 = 8, C3 = 2	14 (42%)	Mean extension 19°, mean flexion 126°	92% satisfactory‡ (only 25 patients evaluated)	Hardware failure (5), infection (2), olecranon osteotomy nonunion (2), class-II HO** (2)	Repeat ORIF& (2), TBW‡ removal (6), olecranon osteotomy and repeat ORIF& (2)
Sanders et al. ³⁸	17	51 (12-85)	>24	C1 = 4, C2 = 3, C3 = 10	7 (41%)	108° (55°-140°)	76% satisfactory‡	Delayed union (2), infection (2), pulmonary embolism (1), ulnar neuropathy (1)	Hardware removal (3), ulnar nerve decompression (1)
McKee and Jupiter ³⁹ (closed fractures)	25	47 (19-85)	37 (18-75)	C = 25	None	108° (55°-140°)	Mean DASH* 20 (0-55)	Ulnar neuritis (3), transient radial nerve palsy (1), nonunion (1), malunion (1)	TBW‡ removal (3), repeat ORIF& (1), elbow release (2)
McKee et al. ⁴⁰ (open fractures)	26	44 (17-78)	51 (10-141)	C1 = 5, C2 = 13, C3 = 8	100%	97° (55°-140°)	Mean DASH* 23.7 (0-57.5); 60% satisfactory MEPS†	Septic nonunion (1), delayed union (4), transient radial nerve palsy (1)	Repeat ORIF& (3)
Pajarinen and Bjorkenheim ⁴¹	21	44 (16-81)	24 (10-41)	C1 = 6, C2 = 12, C3 = 3	5 (24%)	107° (98°-116°)	56% satisfactory OTA+	Deep infection (1), nonunion (2), traumatic nerve injuries (3), olecranon osteotomy nonunion (1)	Repeat ORIF& (2)
Gofton et al. ⁴²	23	53 (16-80)	45 (14-89)	C1 = 3, C2 = 11, C3 = 9	7 (30%)	122° (extension loss 19°±12°, flexion 142°±6°)	Mean DASH* 12 (0-38), 93% subjective satisfaction, 87% satisfactory MEPS†	Deep infection (1), olecranon osteotomy nonunion (2), class-II HO** (3), osteonecrosis (1), reflex sympathetic dystrophy (1), capitellar nonunion (1)	Olecranon osteotomy repeat and ORIF& (2), elbow release (3), capitellar ORIF& (1)
Soon et al. ⁴³	15	43 (21-80)	12 (2-27)	B = 3, C1 = 4, C2 = 4, C3 = 4	None	109° (45°-145°)	86% satisfactory MEPS†	Transient ulnar neuritis (2), hardware failure (3), nonunion (1)	Total elbow arthroplasty (1), repeat ORIF& (3), elbow manipulation or release (4)
Current study	32	58 (16-99)	24 (12-60)	A3 = 3, C2 = 4, C3 = 25	13 (41%)	Mean extension 26° (0°-55°), mean flexion 124° (80°-150°)	83% satisfactory MEPS†	Delayed union (1), ulnar neuropathy (6), class-II HO** (4), infection (1)	Wound débridement or coverage (4), bone-grafting (1), HO removal (4), distraction arthroplasty (1), triceps reconstruction (1)

‡ Jupiter rating system. *DASH: Disabilities of the Arm, Shoulder and Hand questionnaire. †MEPS: Mayo Elbow Performance Score. +OTA: Orthopaedic Trauma Association rating. **Class-II HO: heterotopic ossification restricting motion. &ORIF: open reduction and internal fixation. ‡TBW: tension band wiring.