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Research Article

ELBOW DISLOCATION WITH INTRA-ARTICULAR FRACTURE: THE RESULTS OF OPERATIVE TREATMENT WITHOUT REPAIR OF THE MEDIAL COLLATERAL LIGAMENT

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Abstract:

Aim: To determine the effectiveness of a protocol for the treatment of fracture-dislocations of the elbow based on the concept that, if dislocation of the elbow with associated fractures can be made to resemble a simple elbow dislocation by repairing or reconstructing the fractured structures, repair of the medial collateral ligament (MCL) will not be necessary.

Methods: 34 patients with a posterior dislocation of the elbow associated with one or more intra-articular fractures were selected. The mean age of these 19 men and 15 women was 48 years. Associated fractures included the capitellum, trochlea, and lateral epicondyle in 3 patients; the olecranon in 1 patient; and the radial head in 30 patients (with concomitant fracture of the coronoid process—the so-called “terrible triad” of the elbow—in 22 patients, and concomitant fracture of the coronoid and olecranon in 1 patient). Operative treatment consisted of open reduction internal fixation (ORIF) or prosthetic replacement of all fractures and reattachment of the origin of the lateral collateral ligament (LCL) complex to the lateral epicondyle. The MCL was not repaired.

Results: Two patients had postoperative instability related to noncompliance, had reconstructive procedures, and were considered failures. An average of 32 months after injury, the remaining 32 patients regained an average of 120° ulnohumeral motion and 142° forearm rotation. Twenty-five of 34 patients (74%) had good or excellent results according to the system of Broberg and Morrey. Patients with terrible triad injuries had an average of 117° ulnohumeral motion and 137° forearm rotation, and 17 of 22 patients (77%) had good or excellent results.

Conclusions: MCL repair is unnecessary in the treatment of dislocation of the elbow with associated intra-articular fractures, provided that the articular fractures and the LCL are repaired or reconstructed.

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INTRODUCTION:

In most elbow dislocations the medial and lateral collateral ligaments (MCL and LCL) are torn.¹⁻³ Nonetheless, this injury is best treated with closed manipulative reduction and active elbow exercises initiated within 2 weeks of injury. [1,2,4,5] open reduction and temporary hinged external fixation treatment protocol is used for chronic simple elbow dislocation. [6,7] In both acute and chronic situations, the MCL heals or forms a scar and functions well without the need to reconstruct with a tendon graft. Reconstruction of the MCL with a tendon graft is helpful in throwing athletes and in iatrogenic injuries with chronic MCL attenuation, [8,9] but it is rarely needed to address chronic problems after elbow trauma. When dislocation of the elbow is associated with one or more articular fractures, it has been suggested that repair of all of the associated fractures will convert the injury to one that is comparable to an elbow dislocation without associated articular fracture—an injury in which repair of the MCL is not necessary. [10,11] The LCL is felt to be responsible for the majority of persistent or recurrent elbow subluxation or dislocation [12,13] and can be repaired quite easily with the lateral operative exposure that is usually used to address the associated fractures. In contrast, repair of the MCL requires additional medial dissection and mobilization of the ulnar nerve. Some elbow authorities advocate a protocol in which the MCL is the final structure considered for repair, and they believe that repair of the MCL is rarely necessary. Nonetheless, many orthopedic surgeons still consider repair of the MCL an important part of the operative treatment of an elbow fracture dislocation perhaps due to the influence of several biomechanical studies emphasizing the important role of the MCL in valgus stability of the elbow. In our opinion, repair of the MCL is not routinely necessary in the treatment of an elbow fracture dislocation injury.

METHOD:**Inclusion criteria:**

All fractures were either repaired (open reduction and internal fixation) or reconstructed with a prosthesis;

2) The lateral collateral ligament was reattached to its origin from the lateral epicondyle; 3) The MCL was not repaired; 4) Operative treatment was performed within 14 days in dislocated elbows and within 25 days in reduced elbows, with delays due to the referral nature of the practice.

Exclusions criteria:

included 4 patients treated during a transitional early part of the series that did not have repair of a small coronoid fracture (2 patients with terrible triad injuries, and 2 patients with anteromedial facet coronoid fractures); 2 patients with very complex injuries in whom the MCL was repaired (an open distal humerus fracture and an open anterior olecranon fracture-dislocation, each with avulsion of both the MCL and the LCL from the epicondyles—fixation was performed because the injury had created the necessary exposure); 1 patient with a comminuted coronoid fracture that was reconstructed with a fragment of the radial head secured with a screw and protected with temporary hinged external fixation; and 1 patient who declined a metal prosthesis and had radial head excision without replacement. Seven patients were followed for fewer than 6 months and could not be located (5 men and 2 women; 4 with terrible triad injuries, 2 with dislocation and fracture of the radial head, and 1 with dislocation and fracture of the capitellum/trochlea).

Procedure:

The 34 patients who satisfied the inclusion and exclusion criteria were evaluated for review of the medical record (Table 1). Sixteen of the 34 patients in this investigation overlap with a recent investigation that focused on prosthetic arthroplasty of the radial head. There were 19 men and 15 women with an average age of 48 years (range 17–86 years). The right arm was injured in 15 patients (13 dominant) and the left arm was injured in 19 patients (2 dominant). Nineteen patients were injured in a fall from a standing height, 13 patients in a fall from a greater height, and 2 patients in a motor vehicle accident. None of the injuries were associated with open wounds.

Table 1. Patients With Fracture-Dislocation of the Elbow

Patient	Gender	Age	Injury Pattern	Fracture (Mason)	Fracture (Regan and Morrey)	Radial Head Fracture (O'Driscoll)	Coronoid Fracture
1	F	63	Radial head	3	n/a	n/a	
2	F	53	Radial head	2	n/a	n/a	
3	M	17	Radial head	3	n/a	n/a	
4	M	41	Radial head	2	n/a	n/a	
5	F	64	Radial head	3	n/a	n/a	
6	M	24	Radial head	2	n/a	n/a	
7	M	40	Radial head	2	n/a	n/a	
8	M	48	Coronoid radial head (Terrible Triad)		3	2	1
9	F	70	Coronoid radial head (Terrible Triad)		2	2	1
10	M	32	Coronoid radial head (Terrible Triad)		2	2	1
11	M	58	Coronoid radial head (Terrible Triad)		3	2	1
12	M	73	Coronoid radial head (Terrible Triad)		3	2	1
13	F	37	Coronoid radial head (Terrible Triad)		2	2	1
14	F	45	Coronoid radial head (Terrible Triad)		3	2	1
15	M	41	Coronoid radial head (Terrible Triad)		2	2	1
16	F	75	Coronoid radial head (Terrible Triad)		2	2	1
17	M	49	Coronoid radial head (Terrible Triad)		2	2	1
18	F	59	Coronoid radial head (Terrible Triad)		2	2	1
19	M	24	Coronoid radial head (Terrible Triad)		2	2	1
20	M	34	Coronoid radial head (Terrible Triad)		3	2	1
21	M	36	Coronoid radial head (Terrible Triad)		2	2	1
22	M	27	Coronoid radial head (Terrible Triad)		3	2	1
23	M	55	Coronoid radial head (Terrible Triad)		3	2	1
24	F	57	Coronoid radial head (Terrible Triad)		3	2	1
25	F	37	Coronoid radial head (Terrible Triad)		3	2	1
26	M	36	Coronoid radial head (Terrible Triad)		3	2	1
27	M	68	Coronoid radial head (Terrible Triad)		3	2	1
28	M	55	Coronoid radial head (Terrible Triad)		2	2	1
29	F	44	Coronoid radial head (Terrible Triad)	3	2	1	30 F 86 Posterior olecranon fracture-dislocation 2 3 3
31	F	46	Olecranon fracture	n/a	n/a	n/a	32 M 29 Capitellum/trochlea n/a n/a n/a
33	F	40	Capitellum/trochlea	n/a	n/a	n/a	
34	F	74	Capitellum/trochlea	n/a	n/a	n/a	

Table 1. Patients With Fracture-Dislocation of the Elbow

Patient	Gender	Age	Injury Pattern	Fracture (Mason)	Fracture (Regan and Morrey)	Radial Head Coronoid Fracture (O'Driscoll)	Coronoid Fracture
30	F	63	Radial head	3	n/a	n/a	
31	F	53	Radial head	2	n/a	n/a	
32	M	17	Radial head	3	n/a	n/a	
33	M	41	Radial head	2	n/a	n/a	
34	F	64	Radial head	3	n/a	n/a	
35	M	24	Radial head	2	n/a	n/a	
36	M	40	Radial head	2	n/a	n/a	
37	M	48	Coronoid radial head (Terrible Triad)		3	2	1
38	F	70	Coronoid radial head (Terrible Triad)		2	2	1
39	M	32	Coronoid radial head (Terrible Triad)		2	2	1
40	M	58	Coronoid radial head (Terrible Triad)		3	2	1
41	M	73	Coronoid radial head (Terrible Triad)		3	2	1
42	F	37	Coronoid radial head (Terrible Triad)		2	2	1
43	F	45	Coronoid radial head (Terrible Triad)		3	2	1
44	M	41	Coronoid radial head (Terrible Triad)		2	2	1
45	F	75	Coronoid radial head (Terrible Triad)		2	2	1
46	M	49	Coronoid radial head (Terrible Triad)		2	2	1
47	F	59	Coronoid radial head (Terrible Triad)		2	2	1
48	M	24	Coronoid radial head (Terrible Triad)		2	2	1
49	M	34	Coronoid radial head (Terrible Triad)		3	2	1
50	M	36	Coronoid radial head (Terrible Triad)		2	2	1
51	M	27	Coronoid radial head (Terrible Triad)		3	2	1
52	M	55	Coronoid radial head (Terrible Triad)		3	2	1
53	F	57	Coronoid radial head (Terrible Triad)		3	2	1
54	F	37	Coronoid radial head (Terrible Triad)		3	2	1
55	M	36	Coronoid radial head (Terrible Triad)		3	2	1
56	M	68	Coronoid radial head (Terrible Triad)		3	2	1
57	M	55	Coronoid radial head (Terrible Triad)		2	2	1
58	F	44	Coronoid radial head (Terrible Triad)	3	2	1	30 F 86 Posterior olecranon fracture-dislocation 2 3 3
31	F	46	Olecranon fracture	n/a	n/a	n/a	32 M 29 Capitellum/trochlea n/a n/a n/a
	35	F	40	Capitellum/trochlea	n/a	n/a	n/a
	36	F	74	Capitellum/trochlea	n/a	n/a	n/a

Table 1. *Continued*

Limb (Dom)	Treatment: Radial Head	Treatment: Coronoid	Treatment: Ulnar Nerve	Subsequent	Subsequent	Follow-Up
				Ulnar Nerve Interval Transposition	Contracture Release Failure (months)	Instability/
L	Prosthesis	n/a	46			
(R)	Prosthesis	n/a	y (5 month)	HO		47
L	Prosthesis	n/a	12			
(R)	ORIF n/a	50				
L	Prosthesis	n/a	14			
(R)	ORIF n/a	12				
L	ORIF n/a	51				
(L)	Prosthesis	Suture	36			
R	Prosthesis	Suture	43			
L	ORIF Suture	14				
R	Prosthesis	Suture	Release 38			
L	Prosthesis	Suture	12			
(R)	Prosthesis	Suture	y (7 months)	46		
(R)	Prosthesis	Suture	Release 35			
(R)	Prosthesis	Suture	31			
L	Prosthesis	Suture/screw	22			
(R)	Prosthesis	Suture/screw	25			
(R)	Prosthesis	Suture	y (14 months)	HO		29
L	Prosthesis	Suture	29			
L	Prosthesis	Suture	Release 36			
L	Prosthesis	Suture	Release 35			
L	Prosthesis	Suture	12			
(R)	Prosthesis	Suture	y (12 months)	HO		28
(R)	Prosthesis	Suture/screw	Bicycling			N/A
L	Allograft	Suture	HO 12			
L	Prosthesis	Suture	13			
L	Prosthesis	Suture	36			
(R)	Prosthesis	Suture	y (20 months)	25		
(R)	Prosthesis	Suture	53			
L	Prosthesis	Plate and screws	Transposition			12
L	n/a	n/a	Release 46			
(L)	n/a	n/a	58			
R	n/a	n/a	75			
L	n/a	n/a	Discarded splint	N/A		

RESULTS AND DISCUSSION:

Complications and Subsequent Surgeries:

Instability: Two patients experienced complications related to postoperative instability, both associated with noncompliance and inappropriate use of the arm. One patient with a complex articular fracture of the distal humerus did not return to the office for a month after surgery, at which time she was noted to have discarded her splint, used her arm inappropriately, and subluxated the elbow. The other patient with a terrible triad injury of the elbow had a dislocation when she was riding her bicycle within 2 weeks of surgery. The first patient declined additional surgery initially and subsequently had a total elbow arthroplasty at another institution; the second had interposition arthroplasty performed by a different surgeon. None of the remaining patients had symptoms referable to instability or detectable varus or valgus laxity at final evaluation.

Other complications: Five patients (12%; 4 with terrible triad injuries and 1 with dislocation and fracture of the radial head) developed ulnar neuropathy between 5 and 20 months after surgery (average 11.6 months). All 5 patients had subsequent subcutaneous anterior transposition of the ulnar nerve, 3 in conjunction with operative treatment of elbow stiffness. One other patient had subsequent surgery to address elbow stiffness. Heterotopic ossification contributed to the elbow stiffness in all 4 patients that had subsequent operations to address elbow stiffness.

Final Functional Results According to Broberg and Morrey: The patients salvaged with total elbow arthroplasty and interposition arthroplasty were considered failures and were otherwise excluded from the analysis of functional results. The remaining

32 patients were followed for an average of 32 months (range 12–75 months) after the index surgery. The average arc of ulnohumeral motion was 120° (range 65° to 145°), with an average flexion of 135° (range 100° to 155°) and an average flexion contracture of 15° (range 0° to 55°). The average arc of forearm rotation was 142° (range 0° to 175°), with an average pronation of 77° (range 0° to 90°) and an average supination of 65° (range 0° to 85°). The average Broberg and Morrey score was 89 (range 53–100). The categorical ratings were as follows: 12 excellent, 13 good, 6 fair, and 3 poor results (including the 2 failures). Eight patients had radiographical signs of arthrosis: 7 patients had grade 1 arthrosis, and 1 patient had grade 2 arthrosis, according to the system of Broberg and Morrey. Other outcome measures. Among the 25 patients who returned for a research-specific evaluation, the average follow-up interval was 37 months (SD 15 months). The average DASH score was 15 (range 0–92); the average ASES score was 91 (range 63–100); and the average MEPI score was 89 (range 45–100). The categorical ratings according to the MEPI included 13 excellent, 10 good, 1 fair, and 1 poor. The average visual analog score for patient satisfaction (recorded on the ASES instrument) was 9 (range 5–10), with 10 representing completely satisfied and 0 representing not at all satisfied. Patients with terrible triad injuries. One noncompliant patient's elbow dislocated again. Among the remaining 21 patients followed for an average of 29 months (range 12–53 months) after the index surgery, the average arc of ulnohumeral motion was 117° (range 75° to 145°), with an average flexion of 134° (range 100° to 150°) and an average flexion contracture of 17° (range 0° to 45°). The average arc of forearm rotation was 137° (range 0° to 180°), with an average pronation of 75° (range 0° to 90°) and an average supination of 62° (range 0° to 85°). The average Broberg and Morrey score was 88 (range 53–100). The categorical ratings were as follows: 6 excellent, 11 good, 3 fair, and 2 poor (including the failure). Seven patients had radiographical signs of arthrosis: 6 patients had grade 1 arthrosis, and 1 patient had grade 2 arthrosis, according to the system of Broberg and Morrey.

CONCLUSION:

Elbow stability and satisfactory function can be restored without MCL repair in most dislocated elbows with associated intra-articular fractures. This does not mean that ours is the optimal protocol for treating these injuries, and future comparative studies might evaluate the role of routine repair of coronoid fractures or MCL injuries in particular.

REFERENCE:

1. Durig M, Muller W, Ruedi TP, Gauer EF. The operative treatment of elbow dislocation in the adult. *J Bone Joint Surg* 1979;61A:239–44.
2. Josefsson PO, Gentz CF, Johnell O, Wendeberg B. Surgical versus non-surgical treatment of ligamentous injuries following dislocation of the elbow joint. A prospective randomized study. *J Bone Joint Surg* 1987;69A: 605–8.
3. Josefsson PO, Johnell O, Wendeberg B. Ligamentous injuries in dislocations of the elbow joint. *Clin Orthop Relat Res* 1987;(221):221–5.
4. Mehlhoff TL, Noble PC, Bennett JB, Tullos HS. Simple dislocation of the elbow in the adult. Results after closed treatment. *J Bone Joint Surg* 1988;70A:244–9.
5. Protzman RR. Dislocation of the elbow joint. *J Bone Joint Surg* 1978;60A:539–41.
6. Jupiter JB, Ring D. Treatment of unreduced elbow dislocations with hinged external fixation. *J Bone Joint Surg* 2002; 84A:1630–5.
7. Ring D, Hannouche D, Jupiter JB. Surgical treatment of persistent dislocation or subluxation of the ulnohumeral joint after fracture-dislocation of the elbow. *J Hand Surg* 2004; 29A:470–80.
8. Conway JE, Jobe FW, Glousman RE, Pink M. Medial instability of the elbow in throwing athletes. Treatment by repair or reconstruction of the ulnar collateral ligament. *J Bone Joint Surg* 1992;74A:67–83.
9. Jobe FW, Stark H, Lombardo SJ. Reconstruction of the ulnar collateral ligament in athletes. *J Bone Joint Surg* 1986;68A: 1158–63.
10. O'Driscoll SW, Jupiter JB, Cohen MS, Ring D, McKee MD. Difficult elbow fractures: Pearls and pitfalls. *Instructional Course Lectures*. 2003. p. 113–34.
11. Ring D, Jupiter JB. Fracture-dislocation of the elbow. *J Bone Joint Surg* 1998;80A:566–80.
12. O'Driscoll SW, Bell DF, Morrey BF. Posterolateral rotatory instability of the elbow. *J Bone Joint Surg* 1991;73A: (440–6).
13. Osborne G, Cotterill P. Recurrent dislocation of the elbow. *J Bone Joint Surg* 1966;48B:340–6.