Impact of Hand Dominance on Functional Recovery Following Upper Extremity Injuries

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INTRODUCTION: Hand dominance is commonly elicited from patients with upper extremity injuries; however, its influence on patient outcomes is unclear. The few studies that have investigated the relationship have reported mixed results. Furthermore, the impact of hand dominance on outcomes appears to be modulated by factors such as age, sex, and operative versus non-operative management. This study sought to determine the influence of hand dominance on patient recovery following operative and non-operative management of upper extremity injuries.

METHODS: This was a retrospective subgroup analysis of four multi-centre prospective randomized controlled trials of patients with upper extremity injuries [Humeral Diaphyseal RCT, PERK-1 (elbow fractures and dislocations), Ulnar Diaphyseal RCT, and Distal Radius RCT]. IRB approval was granted. Patient and injury characteristics including age, sex, injury classification, and management (operative versus non-operative) were collected. Clinical and patient-reported outcome measures (PROMs), including the Disabilities of the Arm, Shoulder, and Hand (DASH) were collected. Kruskal-Wallis Rank Sum tests and Pearson's Chi-Squared tests were used to compare patient demographics between the different studies. A multiple variable regression analysis determined variables that predicted patient-reported outcome scores with the variable of interest being dominant extremity injured (yes/no).

RESULTS: Across the four trials, 623 patients met inclusion criteria. At the two-week follow-up, DASH scores were significantly higher (worse) in patients with injuries of their dominant extremity (53±21 versus 59±21; p=0.02). However, at subsequent follow-ups out to 12 months post-injury, there were no differences in DASH scores between patients with dominant versus non-dominant sided injuries. Based on regression analysis, injury to the dominant extremity was a significant predictor of higher DASH scores at two weeks post-injury, with an 8.5-point greater impairment (CI = 1.0 – 15.9; p = 0.026).

DISCUSSION: This study identified significantly greater early impairment in patients with an injury to their dominant upper extremity. This impairment did not persist beyond two weeks from the time of injury. This difference may not be clinically significant, however, given a minimal clinically important difference for the DASH score of 10, and our observed difference of 8.5. Analysis of additional PROMs and functional outcomes is underway. These findings will help inform patient counselling regarding expectations for functional recovery after upper extremity injuries.

CLINICAL RELEVANCE: Patients with injuries to their dominant-side upper extremity have greater impairment early on in their recovery, however, this does not persist beyond the two-week follow-up appointment.

	Distal Radius	Humeral Shaft	PERK 1	Ulnar Shaft	p-value
Age	54 (16)	44 (17)	45 (16)	41 (15)	<0.001
Missing	0	4	1	2	
Sex					<0.001
Female	148/201 (74%)	66/171 (39%)	73/149 (49%)	27/99 (27%)	
Male	53/201 (26%)	105/171 (61%)	76/149 (51%)	72/99 (73%)	
Missing	0	1	0	2	
Dominant Side Injured					
No					0.3
Yes	89/198 (45%)	80/159 (50%)	79/145 (54%)	14/32 (44%)	
Missing	109/198 (55%)	79/159 (50%)	66/145 (46%)	18/32 (56%)	
	3	13	4	69	
Handedness					0.4
Ambidextrous	1/199 (0.5%)	4/165 (2.4%)	0/145 (0%)	0/32 (0%)	
Left	18/199 (9.0%)	13/165 (7.9%)	16/145 (11%)	4/32 (12%)	
Right	180/199 (90%)	148/165 (90%)	129/145 (89%)	28/32 (88%)	
Missing	2	7	4	69	

Table 1: Comparison of patient demographics and side of upper extremity injury between four randomized clinical trials. Values are displayed as mean (SD) or n/N (%).