The Bone & Joint Journal
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Factors Associated with Magnitude of Limitations During Recovery from Fracture of the Proximal Humerus

Journal:	*The Bone & Joint Journal*
Manuscript ID	BJJ-2018-0857
Manuscript Type:	Original Article
Keywords:	Proximal Humerus Fracture, Outcomes, Limitations, Disability, Recovery, Psychosocial Factors

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Abstract

Background

The purpose of this study was to identify factors associated with limitations in function (measured by PROMs) 6 to 9 months after a proximal humerus fracture, from a range of demographic, injury, psychological, and social variables measured within a week and 2 to 4 weeks after injury.

Methods

We enrolled 185 adult patients sustaining an isolated proximal humerus fracture and invited them to complete PROMs at their initial visit within the outpatient surgical practice (maximum 1 week post fracture), between 2 to 4 weeks, and between 6 and 9 months after injury. 173 patients completed the final assessment. Bivariate analysis was performed followed by multivariable regression analysis accounting for multicollinearity using partial R^2, correlation matrices and variable inflation factor assessment.

Results

Multiple variables within a week of injury and 2 to 4 weeks after injury correlated with PROMs months after injury in bivariate analysis. Multivariable analysis showed kinesiophobia measured within a week of injury and self-efficacy measured at 2 to 4 weeks were the strongest predictors of limitations 6 to 9 months after injury. Regression models accounted for a substantial amount of variance in all PROMs at both time points.

Conclusions

Recovery from a proximal humerus fracture appears to be enhanced by greater resilience (more effective coping strategies such as overcoming fears of movement and re-injury and greater perseverance with activity despite pain) within a month of injury. Stress, distress, and less effective coping strategies are modifiable using cognitive and behavioural treatments. These findings could be a catalyst for incorporating routine assessment and treatment of the psychological and social determinants of health in orthopaedic practice.

Level of Evidence: Level II –Prospective Cohort Study

Introduction

The World Health Organisation (WHO) International Classification of Disability, Functioning and Health (ICF) framework encourages us to study illness comprehensively, through the eyes of the patient (1) (Figure 1). There is mounting evidence that psychological factors (e.g. depression, anxiety, somatization, catastrophic-thinking, lower self-efficacy) and social factors (e.g. less support from family and friends--both within the contextual factors domain of the WHO framework--are associated with greater symptoms and limitations in the context of rotator cuff tendinopathy and persistent shoulder pain (2)(3). The factors predictive of functional limitations after fractures of the proximal humerus are less clear (4). Recent evidence has highlighted that surgery to restore anatomy after shoulder fracture does not improve outcomes in a predictable manner (5)(6).

This prospective, longitudinal cohort study sought to identify demographic, injury, psychological, and social factors associated with limitations in function at 6 to 9 months after a fracture of the proximal humerus (Figure 2). The primary null hypothesis was that the magnitude of limitations (measured by the Patient Reported Outcome Measurement Information System Upper Extremity Physical Function Computer Adaptive Test, PROMIS UE) 6 to 9 months after a proximal humerus fracture was not associated with psychological and social factors assessed within a week of injury, accounting for demographic and injury-related factors. Secondarily, we assessed the influence of psychological and social variables measured 2-4 weeks after injury on 6-9 month PROMIS UE. Finally, we assessed the influence of these factors on other Patient Reported Outcome Measures (PROMs; the Quick Disabilities of the Arm, Shoulder and Hand [QuickDASH], the European Quality of Life Index-3L [EQ-5D-3L], and the Oxford Shoulder Score) measured 6-9 months after injury.

Materials and Methods

We enrolled 185 consecutive, new, adult patients presenting to a Level I trauma center within a week of sustaining an isolated proximal humerus fracture. Recruitment for this prospective, research and ethics committee approved study occurred between 1st January 2016 and 31st August 2016 (IRAS No.16/YH/0017). Inclusion criteria were; fluency in spoken and written English, age eighteen years or older, and ability to provide informed consent. We excluded people with other injuries, sustained at the time of the proximal humeral fracture.

Of the 185 patients, eight (4.3%) declined participation due to time constraints leaving a total of 177 for analysis, including 128 women and 49 men with a mean age of 66 years ± 16 (range, 18-95) (Table 1). 173 completed the final assessment 6-9 months after injury. Four patients died of unrelated illness during the study period. Demographic details included education level, marital, social and work status, as well as arm dominance. Clinical

variables included prior arm injuries, side of injury, neurovascular compromise, open/closed fracture, operative treatment, and adverse events gathered from health records. Age-adjusted Charlson Comorbidity Index (CACI) (7) and Index of Multiple Deprivation 2015 (IMD) (8), were generated using comorbidity data and postal codes respectively. CACI is a validated scoring tool predictive of one-year mortality accounting for a range of comorbidities (7). IMD combines information from national administrative data to form a relative rank of social deprivation based on location defined by the UK Office for National Statistics (8). The rank was converted to a % (IMD factor) with lower % signifying greater deprivation.

PROMs were completed on a secure, encrypted, web-based data collection platform (Assessment Center[SM], Northwestern University) (9). Data was captured at baseline (initial orthopaedic visit, within a week following emergency department review), early follow-up (2-4 weeks) and final assessment (6-9 months). Patients completed assessments in person (71%), by telephone (24%) or via email using an electronic link (5%).

Adverse events were limited to those directly related to operative treatment of the fracture e.g. wound infection, revision surgery, as well as those with strong subjective components e.g. stiffness treated with manipulation under anaesthetic. Injuries were classified by energy [e.g. high speed road traffic accident (high); fall from standing height (low)] and AO (10) and Neer (11) systems. This provided a full characterization of injury types. The Neer classification was categorized into greater tuberosity, 2-part, and more than 2-part fractures to simplify the analysis. Use of opioid analgesia was continued use of any opioids more than 2 weeks after injury and those using opioids prior to injury were only included if there was an increase in their analgesic intake secondary to their fracture. Use of anti-depressants included use for a pre-existing diagnosis of depression as well as newly diagnosed major depression within the first month after injury.

Outcome measures were delivered in the following order: i) PROMIS UE (12), ii) PROMIS Pain Interference (PROMIS PI) (13), iii) PROMIS Depression (15), iv) PROMIS Anxiety (15), v) PROMIS Emotional support (PROMIS ES) (16), vi) PROMIS Instrumental support (PROMIS IS) (16), vii) QuickDASH (20), viii) OSS (20), ix) EQ-5D-3L (28), x) Pain Catastrophizing Scale (PCS) (23), xi) Pain Self-efficacy Questionnaire-2 (PSEQ-2) (31), xii) Tampa Scale for Kinesiophobia-11 (TSK-11) (26). Interpretation of the utilised PROMs are detailed in Table 2.

Statistical analysis

Descriptive statistics included frequencies and percentages for discrete variables, and mean, standard deviation and range for normally distributed continuous variables. Bivariate analysis involved unpaired Student's t-

test or analysis of variance for comparing continuous and discrete variables and Pearson correlation for continuous variables.

Multicollinearity is the phenomenon where highly correlated variables in a regression model enable one variable to be linearly predicted from another with a high degree of accuracy. This was assessed using partial R^2, correlation matrices, and variance inflation factor (VIF). Correlations greater than 0.80 were considered indicative of multicollinearity and led to omission of the variable causing the lowest change in the model's adjusted R^2. In other words, the analysis aimed for the lowest reduction in the model's overall ability to explain variability in the dependent variable. VIF is an index measuring the extent to which variance of estimated regression coefficients and independent variables increase due to collinearity. A VIF between 5 and 10 is potentially too high, while a VIF greater than 10 unequivocally indicates multicollinearity. At less than a week, no psychological variables had correlations greater than 0.80 (Table 3a) and VIF was lower than 5 for all variables. At 2-4 weeks, several variables had correlations greater than 0.80 (Table 3b). Thus, PROMIS depression, PROMIS anxiety, PROMIS ES, PCS and TSK-11 were excluded from multivariable analysis at 2-4 weeks, resulting in VIFs lower than 5. Sensitivity analysis demonstrated that omission of variables did not reduce the models' adjusted R^2 i.e. the overall ability to predict the outcome variable.

VIF analysis also indicated multicollinearity between age and CACI (correlation=0.90) (Table 3c). Although CACI incorporates more information than age, several parameters are required to calculate a total score, making it less practical to use in daily practice. Thus, CACI was omitted from multivariable analysis, if both age and CACI had a p-value < 0.10 in bivariate analysis.

After adjusting for multicollinearity, the remaining psychological measures and each independent variable associated with limitations at less than a week and at 2-4 weeks, with $p<0.10$ in bivariate analysis, were entered into multivariable regression. Eight multivariable models were created in total i.e. one for each PROM with independent variables at less than a week and at 2-4 weeks. $p<0.05$ was considered statistically significant in multivariable analysis. Partial R^2 indicated how much each variable accounted for the total variance, which in turn was reflected by the Adjusted R^2, a measure of the percentage of the overall variability in the response variable that could be explained by all the variables included in the model.

Multiple linear imputation was used for missing values (i.e. number of imputations set to 40): IMD factor (1), percentage grip strength of the non-injured side at less than a week (7), percentage grip strength of the non-injured side at 2-4 weeks (3), PSEQ-2 at less than a week (1) and TSK-11 at less than a week (1). This method maintains the overall variability in the data while preserving relationships with other variables. All health-related outcome scores are shown in Table 4.

An a-priori power analysis indicated that a minimum sample size of 160 would provide 80% statistical power with alpha set at 0.05. This was based on a regression with ten predictors and an assumption that an independent variable would account for 3.5% or more of the variability in limitations and the complete model would account for at least 30% variability. All statistical analysis was performed using STATA 14.0 (StataCorp LP, College Station, TX, USA). No sources of funding were related to this work.

Results

Which factors are associated with the magnitude of limitations measured by PROMIS UE 6-9 months after a proximal humerus fracture?

Multiple variables within a week of injury correlated with PROMIS UE 6-9 months after injury in bivariate analysis (Table 5). After adjusting for multi-collinearity and controlling for confounding variables in multivariable analysis, kinesiophobia measured within a week of injury was the strongest predictor of limitations 6 to 9 months after injury. This accounted for 14% of the variance (TSK-11; Partial $R^2 = 0.14$, p=0.000) (Table 6). Combined with a single physical factor (experience of an adverse events) and several other psychological and social factors including older age, marital status (being separated, divorced or widowed), social status (having a partner, friends and family), work status (being unemployed or on worker's compensation), and using opioids or anti-depressants and pain interference, the full model accounted for 66% of the variance in PROMIS UE (Table 6).

Many of the psychological measures 2-4 weeks after injury also correlated with PROMIS UE 6 to 9 months after injury in bivariate analysis (Table 7). In multivariable analysis, including these 2-4 week psychological measures, self-efficacy was the strongest predictor of magnitude of limitations 6-9 months after fracture, accounting for 27% of the variance (PSEQ-2: Partial R^2=0.266, p<0.001) (Table 8). PROMIS PI was the only other significant variable in the final multivariable model, when combined with PSEQ-2 explained 70% over the overall variance (Table 8).

Which factors are associated with the magnitude of limitations measured by QuickDASH, OSS and EQ-5D-3L 6-9 months after a proximal humerus fracture?

In bivariate analysis, many of the psychological measures less than a week after injury correlated with magnitude of limitations 6-9 months after injury measured using QuickDASH, OSS and EQ-5D-3L (Table 5). Kinesiophobia consistently explained a notable proportion of the variability [QuickDASH (Partial R^2=0.09, p=0.001); OSS (Partial R^2=0.115, p=0.000); EQ-5D (Partial R^2=0.098, p=0.006)] (Table 6). Kinesiophobia combined with variables including adverse events and use of anti-depressants consistently explained a substantial proportion of the

variability in the best multivariable models for each PROM [Adjusted R^2: QuickDASH (77%); OSS (73%); EQ-5D (63%); PROMIS UE PF (66%)] (Table 6).

Many of the psychological measures 2 to 4 weeks after injury also correlated with magnitude of limitations 6-9 months after injury measured using QuickDASH, OSS and EQ-5D-3L in bivariate analysis (Table 7). In multivariable analysis, including these 2-4 week psychological measures, self-efficacy, was the strongest predictor of magnitude of limitations 6-9 months after fracture [QuickDASH (Partial R^2=0.12; p<0.001); OSS (Partial R^2=0.25, p<0.001); EQ-5D-3L (Partial R^2=0.38, p<0.001)] (Table 8). Pain self-efficacy combined with other variables including instrumental support, having a partner, family and friends, or being on worker's compensation or involved in a litigation claim explained a substantial proportion of variance in the best multivariable models for each PROM [Adjusted R^2: QuickDASH (81%); OSS (77%); EQ-5D-3L (71%)] (Table 8).

Discussion

Given the mounting evidence that psychological and social determinants of health have an important influence on symptom intensity and magnitude of limitations in musculoskeletal illness, this study addressed the relative importance of such factors during recovery from a proximal humerus fracture. We hoped to identify opportunities for interventions that might speed and optimize recovery from injury.

It is notable that psychological and social determinants of health (effective coping strategies such as lower kinesiophobia and pain interference and higher self-efficacy in particular) accounted for most of the variation in magnitude of limitations during recovery from a fracture of the proximal humerus. Even without considering any injury or anatomical factors, we were able to account for 66% of the variance in PROMIS UE at 6-9 months, using data captured within a week of injury. The strong influence of psychological and social factors on patient reported outcomes is consistent across a range of traumatic and atraumatic upper extremity conditions (27)(28)(29)(30). Given the evidence that cognitive and behavioural therapies (treatments that train people to separate accurate and useful thoughts from misconceptions that may increase symptoms and delay recovery) diminish pain and limitations among traumatic and atraumatic musculoskeletal conditions (27)(31), a more comprehensive treatment approach merits greater consideration.

It is also notable that the influence of the psychological and social determinants of health was consistent across region-specific (QuickDASH), joint-specific (OSS), and general quality of life (EQ-5D-3L) PROMs, and accounted for a large amount of the variation in scores. It is possible that the psychological and social determinants of health are the primary underlying constructs measured by musculoskeletal and general health PROMs. Whilst

healthcare professionals might expect fracture severity, operative treatment, and radiographic deformity, to be dominant influences on a patient's abilities after a fracture, there is growing evidence that such impairment-related factors account for a surprisingly limited amount of variation in physical limitations measured by PROMs (32). Our work supports this observation. We found that injury severity (i.e. fracture classification, energy level, presence of neurovascular compromise, whether the injury was open or closed), did not account for any of the variability in magnitude of limitations. The only pathophysiological factor associated with magnitude of limitations was the presence of adverse events. While two of these were adverse events related to operative intervention (e.g. wound infection; iatrogenic tendon injury), the rest were events with a strong subjective component (e.g. stiffness treated with manipulation under anaesthetic; disproportionate pain 3-6 months after injury defined as prolonged pain; joint pain treated with steroid injection) that have been associated with a range of psychological stressors (33)(34).

Based on variation in magnitude of limitations explained by social determinants [e.g. marital status (being separated, widowed or divorced); social status (having partner, family and friend support); work status (being unemployed or on worker's compensation / undergoing litigation claims), a feeling that others are available to provide hands-on, practical support, that one is being cared for by family, partners and friends and that there is a sense of financial stability or secondary gain may also contribute to fewer symptoms and limitations after proximal humerus fracture (35). Quality of support and social dependence are shown to be strong predictors of outcomes after fractures of the proximal humerus in the elderly, independent of age and injury severity (35)(36). Further studies should assess interventions that maximise facets of social support in all ages and the role of occupational stressors on limitations (37).

The results of this study should be viewed in light of several limitations. First, the generalisability of this study may be questioned as it was performed at a single institution, although the wide variation patient demographics is a positive. Second, although most patients completed PRO measures in person, some were conducted via telephone or online which may have introduced some level of procedural, measurement and responder bias, although most of the instruments we used are validated for phone administration (38). Third, responder burden is possible given the numerous instruments, however mean test times were felt to be acceptable during development of the measurement platform. Nevertheless, this could have been minimised by item randomisation during programming. Fourth, the three categories of fracture classification used for analysis may not provide adequate detail of injury severity. There were relatively few fractures within some AO/OTA or Neer categories, which may have compromised analysis. A much larger study might help variation in PROMs by fracture sub-type but evidence to date suggests this is unlikely to yield further insights (39). Finally, PROMIS ES and PROMIS IS were not assessed at less than 1 week due to a

programming error. Although this may have influenced the analysis it is unlikely to have led to any significant effect on the overall interpretation.

Conclusion

This study found that recovery from a proximal humerus fracture is enhanced by greater resilience (more effective coping strategies such as overcoming fears of movement and re-injury and greater perseverance with activity in spite of pain) within a month of injury. Stress, distress, and less effective coping strategies are modifiable using cognitive and behavioural treatments (40). In combination with an increasing body of evidence with similar findings, these conclusions could be a catalyst for routine assessment and treatment of the psychological and social determinants of health in orthopaedic practice.

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Figure legends

Figure 1. Two examples of the World Health Organisation International Classification of Disability, Functioning and Health Framework applied to patients with Proximal Humerus Fractures

Figure 2. Components of the WHO ICF Framework represented by PROMs and other variables related to assessment of limitations in function after
Proximal Humerus Fractures

Figure 1. The World Health Organisation International Classification of Disability, Functioning and Health

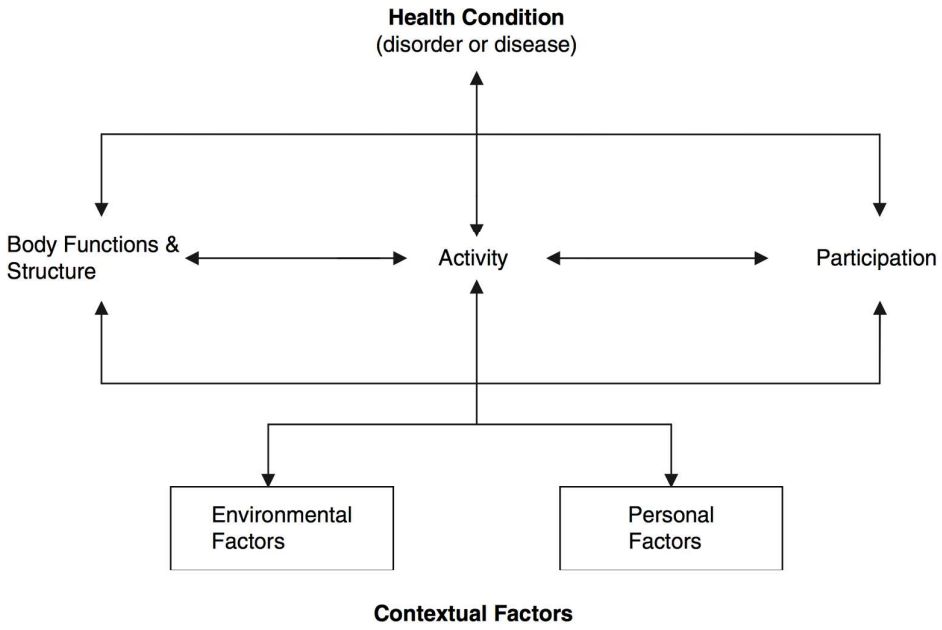
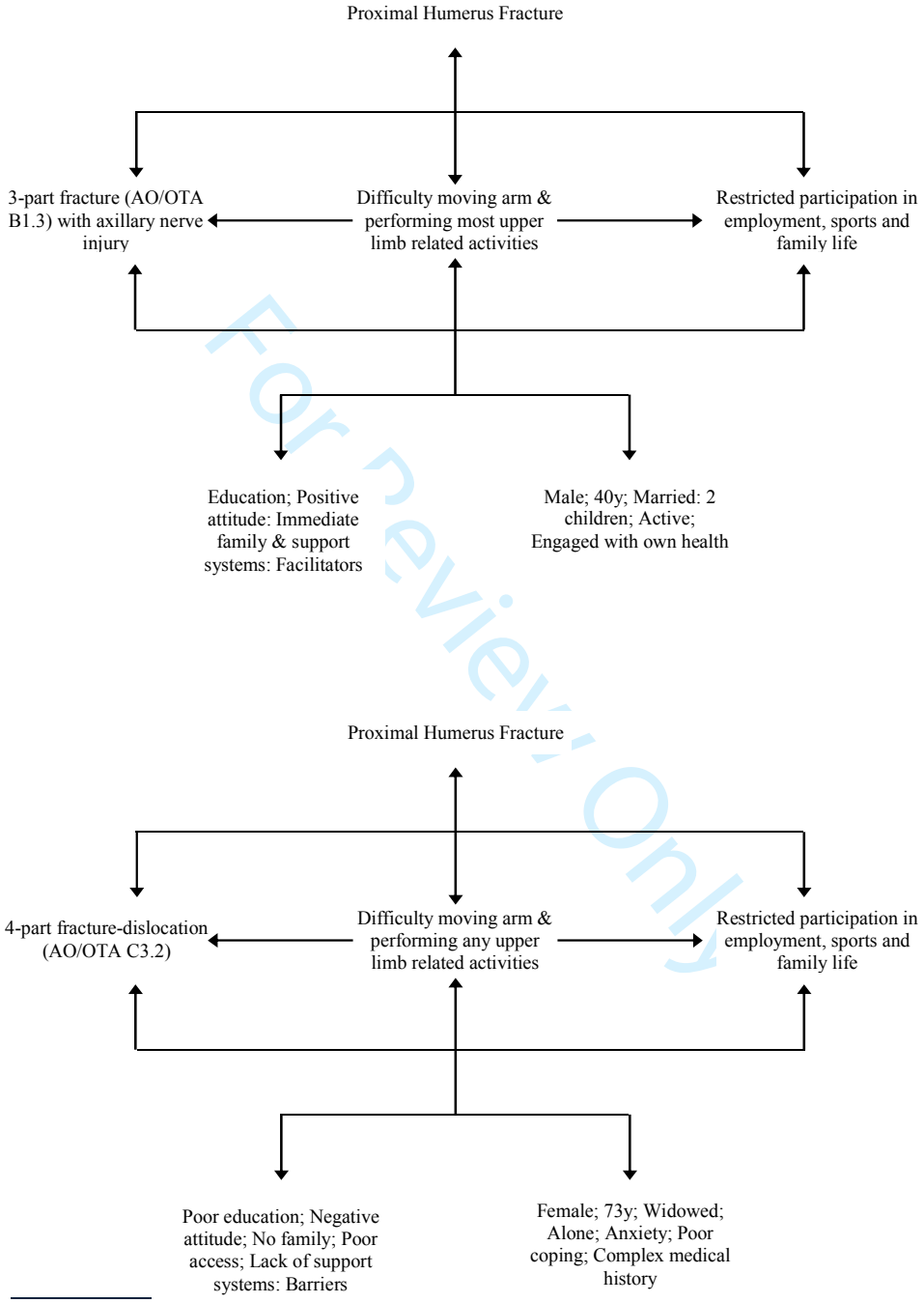


Figure 2. Two examples of the WHO ICF Framework applied to patients with Proximal Humerus Fractures



§ The examples represent a few domains of each component related to the health condition and are not intended to represent a complete overview of impairments, activity limitations, participation restrictions, environmental and personal factors.

‡ Direction or magnitude of arrows may differ for specific situations and/or individuals. Two-directional arrows represent a multi-directional influence

Table 1. Patient Demographics

Demographic	Value	
Subjects enrolled (within 1 week of injury)	177	
Subjects (at 2-4 weeks)	177	
Subjects (at 6-9 months)	173	
Age (years)	66 ± 16	(18 - 95)
Female	72%	(128)
CACI	2.6 ± 1.8	(0 - 6)
Marital status		
Single	15%	(26)
Partner / Married	48%	(86)
Separated / Divorced / Widowed	27%	(65)
Social status		
Alone	29%	(52)
Partner / Friend(s) /Family	62%	(109)
Full / Part-time care	9%	(16)
Education (years)	13.7 ± 2.8	(7 - 22)
Work status		
Working	27%	(48)
Homemaker	5%	(8)
Retired	55%	(99)
Unemployed	5%	(8)
Workers comp / Litigation	8%	(14)
IMD factor	71.7 ± 23.2	(2.7 - 99.8)
Broad injury classification		
Greater tuberosity	21%	(38)
2-Part	40%	(70)
>2-Part	39%	(69)
Dominant side injured	53%	(93)
High energy injury	12%	(22)
Neurovascular compromise	3%	(5)
Open injury	0%	(0)
Surgery	10%	(17)
Adverse events	25%	(44)
Prior fracture to dominant arm	16%	(28)
Prior fracture to non-dominant arm	12%	(22)
Opioid use	48%	(85)
Anti-depressant use	34%	(60)

Continuous variables as mean + standard deviation (range); Discrete variables as percentage (number)
CACI, Age adjusted Charlson Comorbidity Index; IMD, Index of Multiple Deprivation 2015

Patient Reported Outcome Measures (PROMs)	Description
All PROMIS Instruments	A score of 50 points represents the mean and every 10 points away from 50 a standard deviation away from the mean for a general population in the U.S. Higher scores reflect greater levels of the measured construct. For instance, higher PROMIS UE implies greater upper extremity physical function and higher PROMIS Depression reflects greater levels of depression (36)(37)
PROMIS UE (v1.0)	Assesses arm and hand-specific limitations (e.g. writing, lifting heavy objects) (21)(38)
PROMIS PI (v1.0)	Assesses the impact of pain on common activities of daily life including social, cognitive, emotional, physical, and recreational aspects (22)
PROMIS Depression (v1.0)	Assesses negative mood (sadness, guilt), views of self (worthlessness, self-criticism) and diminished positive affect and engagement (loss of interest) within the previous week (23)(24)(39).
PROMIS Anxiety (v1.0)	Assesses levels of anxiety through measuring aspects of fear (e.g. fearfulness, feelings of panic), anxious misery (e.g. worry, dread), hyperarousal (e.g. tension, nervousness, restless) and some somatic symptoms related to arousal (e.g. dizziness) (36)(24)
PROMIS ES (v1.0)	Assesses patient perceived feelings of being cared for and being valued as a person (25)
PROMIS IS (v1.0)	Assesses the perceived availability of support from others in fulfilling specific functions e.g. help with chores, assistance getting to an appointment (25).
QuickDASH	Assesses physical functioning (e.g. daily tasks) and arm symptoms (e.g. pain) using 11 items (206)(207)(208)(209). Total scores are scaled from 0 to 100 with higher scores representing greater limitations (28).
EQ-5D-3L	Assesses five health domains i.e. mobility, self-care, usual activities, pain/discomfort and anxiety/depression, each requiring 3 response levels providing a five-digit number that can be converted to a total index score. Higher scores represent greater overall health (30).
OSS	Assesses the impact on pain, function and activities of daily life pertaining to the shoulder in the previous 4 weeks. Total scores range from 0 to 48 and are formed from responses to 12 items, each with five response categories. Lower scores represent greater limitations (29).
PCS	Assesses maladaptive cognitive responses to nociception (e.g. rumination, magnification, helplessness). Thirteen items are scored from 1 (“not at all”) to 4 (“all the time”) and total scores range from 13 to 52 with higher scores reflecting greater catastrophizing (32).
PSEQ-2	Assesses adaptive coping strategy and the confidence one can achieve one’s goals in spite of pain. Items are scored on a 7-point Likert scale and added to form a total score ranging from 0 to 12, with higher scores indicating greater self-efficacy (33,34).
TSK-11	Assesses fear of painful movement and reinjury. Eleven items are rated on a 4-point scale and added to form a total score ranging from 11 to 44 with higher scores indicating greater kinesiophobia (35).

Table 2 Patient Reported Outcome Measurements (PROMs) and their descriptions

PROMIS, Patient Reported Outcome Measurement Information System; UE, Upper extremity physical function; PI, Pain interference; ES, Emotional Support; IS, Instrumental Support; QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand; EQ-5D-3L, European Quality of Life Index-version 3L, OSS, Oxford Shoulder Score; PCS, Pain Catastrophizing Scale; PSEQ-2, Pain Self-Efficacy Questionnaire; TSK-11, Tampa Scale for Kinesiophobia-11

Table 3. Correlation Matrices

Table 3a. Correlation Matrix of Psychological variables at t=0

	PROMIS PI	PROMIS Depression	PROMIS Anxiety	PCS	PSEQ-2	TSK-11
PROMIS PI	1.0					
PROMIS Depression	0.27	1.0				
PROMIS Anxiety	0.072	0.57	1.0			
PCS	0.36	0.56	0.40	1.0		
PSEQ-2	-0.27	-0.50	-0.18	-0.39	1.0	
TSK-11	0.37	0.31	0.11	0.54	-0.50	1.0

Table 3b. Correlation Matrix of Psychological variables after t=1

	PROMIS PI	PROMIS Depression	PROMIS Anxiety	PCS	PSEQ-2	TSK-11	PROMIS ES	PROMIS IS
PROMIS PI	1.0							
PROMIS Depression	0.65	1.0						
PROMIS Anxiety	0.49	0.73	1.0					
PCS	0.48	0.74	**0.80**	1.0				
PSEQ-2	-0.57	**-0.81**	-0.77	**-0.82**	1.0			
TSK-11	0.55	**0.85**	0.79	**0.83**	**-0.90**	1.0		
PROMIS ES	-0.39	-0.62	-0.64	-0.65	0.66	-0.74	1.0	
PROMIS IS	-0.28	-0.56	-0.70	-0.68	0.67	-0.73	**0.84**	1.0

Table 3c. Correlation Matrix age & CACI

	CACI
Age	**0.88**

Table 4. Health Related Outcomes

Variables	Value t=0			Value t=1			Value t=2		
Performance-based outcomes	n	Mean (SD)	Range	n	Mean (SD)	Range	n	Mean (SD)	Range
Grip strength (% of non-injured side)	170	39.9 ± 10.7	(11.4 - 67.3)	174	47 ± 10.2	(20.6 - 69.7)	172	73.9 ± 13.8	(31.3 - 113.3)
Health-related outcomes	n	Mean (SD)	Range	n	Mean (SD)	Range	n	Mean (SD)	Range
QuickDASH	177	74.7 ± 11.7	(36.4 - 93.2)	177	71.7 ± 15.7	(15.9 - 90.9)	173	31.9 ± 25	(0 - 79.5)
OSS	177	7.9 ± 5.5	(0 - 24)	177	12 ± 7.1	(3 - 34)	173	34.8 ± 11.3	(14 - 48)
EQ5D Index	177	0.317 ± 0.184	(0.038 - 0.667)	177	0.377 ± 0.227	(0.038 - 1)	173	0.749 ± 0.249	(0.14 - 1)
PROMIS UE PF	177	21.9 ± 5.5	(14.7 - 40.7)	177	27.1 ± 5.4	(15.6 - 41)	173	40.5 ± 9.9	(26.2 - 56.4)
PROMIS PI	177	68 ± 6.8	(38.1 - 76.9)	177	66.9 ± 5.9	(46.1 - 74.1)	173	52.8 ± 11.2	(38.7 - 70.3)
PROMIS Depression	177	50.7 ± 9.5	(34.2 - 75.6)	177	50.2 ± 9.6	(34.2 - 69.2)	172	45.1 ± 11.5	(34.2 - 68)
PROMIS Anxiety	177	52.2 ± 11.6	32.9 - 76.2	177	47 ± 10.4	(32.9 - 69.6)	173	44.2 ± 11.2	(32.9 - 63.3)
PROMIS ES	n/m	n/m	n/m	177	51.6 ± 12.1	(32.6 - 66.2)	172	51.3 ± 11.4	(31.5 - 66.2)
PROMIS IS	n/m	n/m	n/m	177	55 ± 9.5	(38.8 - 66.2)	172	53.5 ± 9.1	(38.8 - 66.2)
PCS	177	20 ± 6.8	(13 - 45)	177	19.1 ± 7	(13 - 44)	173	17.8 ± 6.8	(13 - 40)
PSEQ-2	176	8.6 ± 2.4	(3 - 12)	177	7.4 ± 2.6	(1 - 12)	173	8.6 ± 3.3	(2 - 12)
TSK-11	176	28.6 ± 6.3	(15 - 40)	177	24.9 ± 8.1	(11 - 40)	173	20.7 ± 10.2	(11 - 44)

Variables as mean + standard deviation (range)
n/m, Not measured

Table 5. Bivariate at Analysis less than a week after injury

	QuickDASH		OSS		EQ-5D-3L		PROMIS UE PF	
	Value	**p value**	**Value**	**p value**	**Value**	**p value**	**Value**	**p value**
Age	0.2497	**<0.001**	-0.3061	**<0.001**	-0.1433	**0.0599**	-0.3052	**<0.001**
Sex								
Women	33.8 ± 24.1	0.1068	33.9 ± 11.5	0.1000	0.743 ± 0.279	0.2987	40.2 ± 9.5	0.4500
Men	26.8 ± 27.1		37.2 ± 10.8		0.793 ± 0.275		41.5 ± 10.9	
CACI	0.3751	**<0.001**	-0.4111	**<0.001**	-0.2484	**0.0010**	-0.3840	**<0.001**
Marital status								
Single	41 ± 26.1		31.2 ± 11.5		0.632 ± 0.331		38.2 ± 10.9	
Partner / Married	15.7 ± 16.7	**0.0000**	42.2 ± 7.2	**0.0000**	0.917 ± 0.145	**0.0000**	46 ± 8.7	**0.0000**
Separated / Divorced / Widowed	51 ± 18.1		25.8 ± 8.6		0.583 ± 0.264		33.9 ± 6	
Social support status								
Alone	55.7 ± 18.8		25.6 ± 8.6		0.503 ± 0.299		32.8 ± 6.6	
Partner / Friend(s) / Family	18.9 ± 18.7	**0.0000**	40.4 ± 8.9	**0.0000**	0.891 ± 0.166	**0.0000**	44.9 ± 9	**0.0000**
Full / Part-time care	48.9 ± 12.4		23.9 ± 7.2		0.604 ± 0.200		34.2 ± 4.7	
Education	-0.2997	**0.0001**	0.3129	**0.0000**	0.1741	**0.0220**	0.2713	**0.0003**
Work status								
Working	9.9 ± 11.1		44.4 ± 4.7		0.952 ± 0.102		48.1 ± 7.9	
Homemaker	35.8 ± 31.3		33.1 ± 14.4		0.601 ± 0.516		39.8 ± 12.8	
Retired	37.4 ± 22.9	**0.0000**	32.1 ± 11	**0.0000**	0.719 ± 0.264	**0.0000**	38.4 ± 8.7	**0.0000**
Unemployed	52.8 ± 21.6		25.7 ± 8.8		0.553 ± 0.275		34.4 ± 9.2	
Workers compensation / Litigation	56.3 ± 18.5		25.8 ± 8.4		0.545 ± 0.240		33.2 ± 6.9	

IMD Factor	-0.1967	**0.0097**	0.1588	**0.0374**	0.1689	**0.0267**	0.2002	**0.0084**
Broad injury classification								
Greater tuberosity	25.1 ± 26.2		38.7 ± 11.3		0.813 ± 0.303		44.4 ± 11	
2-Part	32.4 ± 24.4	0.1391	34.4 ± 11.1	**0.0443**	0.756 ± 0.267	0.3222	39.5 ± 9.1	**0.0260**
>2-Part	35.1 ± 24.7		33 ± 11.4		0.728 ± 0.274		39.5 ± 9.6	
Dominant side injured								
Yes	34.3 ± 25.7	0.1902	33.7 ± 11.8	0.1926	0.726 ± 0.302	0.1346	39.9 ± 10.1	0.3515
No	29.3 ± 24.1		35.9 ± 10.8		0.790 ± 0.246		41.3 ± 9.7	
High energy injury								
Yes	36.9 ± 27.3	0.3209	33.1 ± 13	0.4646	0.699 ± 0.327	0.3027	40.3 ± 11.4	0.9224
No	31.2 ± 24.7		35 ± 11.1		0.765 ± 0.270		40.6 ± 9.7	
Neurovascular compromise								
Yes	52.7 ± 27.5	**0.0587**	26.6 ± 11.2	0.1036	0.548 ± 0.363	**0.0885**	35.6 ± 11.9	0.2582
No	31.3 ± 24.7		35 ± 11.3		0.763 ± 0.274		40.7 ± 9.8	
Open injury								
Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Surgery								
Yes	39.3 ± 26.5	0.2007	31.3 ± 11.8	0.1871	0.671 ± 0.294	0.1805	37.4 ± 8.4	0.1728
No	31.1 ± 24.8		35.1 ± 11.3		0.766 ± 0.275		40.9 ± 10	
Complication								
Yes	51.2 ± 19.8	**0.0000**	26.2 ± 8.5	**0.0000**	0.546 ± 0.291	**0.0000**	33.5 ± 5.8	**0.0000**
No	25.5 ± 23.3		37.6 ± 10.8		0.826 ± 0.236		42.9 ± 9.9	

Prior dominant side fracture								
Yes	36.6 ± 28.1	0.2801	32.8 ± 12	0.3275	0.666 ± 0.371	0.9695	39.1 ± 10.8	0.3996
No	31 ± 24.4		35.1 ± 11.2		0.774 ± 0.254		40.8 ± 9.7	
Prior non-dominant side fracture								
Yes	37.6 ± 24.4	0.2989	32.6 ± 11.3	0.3784	0.686 ± 0.333	0.2402	37.8 ± 9.9	0.2068
No	31.2 ± 25.1		35 ± 11.4		0.765 ± 0.270		40.9 ± 9.9	
Opioid use								
Yes	44.2 ± 23.9	**0.0000**	29.9 ± 10.5	**0.0000**	0.620 ± 0.302	**0.0000**	35.9 ± 8.4	**0.0000**
No	20.9 ± 20.5		39.2 ± 10.3		0.879 ± 0.183		44.7 ± 9.3	
Anti-depressant use								
Yes	54.8 ± 15.3	**0.0000**	25.5 ± 6.8	**0.0000**	0.523 ± 0.257	**0.0000**	32.9 ± 5.9	**0.0000**
No	21 ± 21		39.2 ± 10.4		0.868 ± 0.211		44.2 ± 9.3	
Performance-based outcomes at t=0	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**
Grip strength (% non-injured side)	-0.3364	**0.0000**	0.3717	**0.0000**	0.3546	**0.0000**	0.3103	**0.0000**
Health-related outcomes at t=0	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**
PROMIS Pain Interference	0.2905	**0.0001**	-0.3167	**0.0000**	-0.1236	**0.0105**	-0.2109	**0.0054**
PROMIS Depression	0.3518	**0.0000**	-0.2953	**0.0001**	-0.3447	**0.0000**	-0.2125	**0.0050**
PROMIS Anxiety	0.1377	**0.0708**	-0.0864	**0.0001**	-0.2447	**0.0012**	0.0009	**0.0026**
PCS	0.4095	**0.0000**	-0.3756	**0.0000**	-0.3307	**0.0000**	-0.3023	**0.0001**
PSEQ-2	-0.4662	**0.0000**	0.4409	**0.0000**	0.3415	**0.0000**	0.4084	**0.0000**
TSK-11	0.5451	**0.0000**	-0.5799	**0.0000**	-0.4505	**0.0000**	-0.5188	**0.0000**

Pearson correlation indicated by r; **bold** indicates statistically significant difference; continuous variables as mean (±standard deviation)

Table 6. Multivariable Analysis of Predictive Factors at less than a week of injury for limitations in function at 6-9 months

QuickDASH	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
Age	0.27	0.03	0.50	0.12	0.029	4.39	0.03	
MS: Separated / Widowed / Divorced	11.42	3.60	19.24	3.96	0.004	4.11	0.05	
SS: Partner / Friend(s) / Family	-12.35	-19.75	-4.96	3.74	0.001	3.86	0.06	
WS: Unemployed	18.87	7.47	30.26	5.77	0.001	1.77	0.07	
WS: Workers compensation	14.67	5.16	24.18	4.81	0.003	2.05	0.06	0.77
Complications	9.75	4.69	14.81	2.56	0.000	1.46	0.11	
Opioid use	5.52	0.69	10.36	2.45	0.025	1.76	0.02	
Antidepressant use	13.28	7.42	19.13	2.96	0.000	2.22	0.11	
TSK-11	0.74	0.31	1.18	0.22	0.001	2.38	0.09	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, neurovascular status, complications, opioid use, antidepressant use, grip strength %, PROMIS PI, PROMIS depression, PROMIS anxiety, PCS, PSEQ-2, TSK-11

OSS	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
Age	-0.14	-0.25	-0.02	0.06	0.021	4.30	0.057	
MS: Separated / Widowed / Divorced	-5.04	-8.98	-1.10	1.99	0.013	4.42	0.037	
SS: Partner / Friend(s) / Family	3.64	0.01	7.27	1.84	0.049	3.88	0.02	
WS: Unemployed	-8.28	-13.77	-2.78	2.78	0.003	1.76	0.059	
WS: Workers compensation	-4.56	-9.16	0.03	2.32	0.032	2.01	0.029	0.73
Complications	-5.21	-7.64	-2.79	1.23	0.000	1.42	0.124	
Antidepressant use	-5.16	-8.01	-2.32	1.44	0.000	2.26	0.108	
TSK-11	-0.40	-0.62	-0.19	0.11	0.000	2.48	0.115	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, complications, opioid use, antidepressant use, broad classification grip strength %, PROMIS PI, PROMIS depression, PCS, PSEQ-2, TSK-11

EQ-5D-3L	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
SS: Partners / Friend(s) / Family	0.18	0.08	0.28	0.05	0.001	3.80	0.331	
WS: Homemaker	-0.17	-0.31	-0.03	0.07	0.020	1.47	0.045	
Complications	-0.14	-0.21	-0.07	0.04	0.000	1.46	0.106	
Opioid use	-0.07	-0.15	0.01	0.03	0.030	1.74	0.026	0.63
Antidepressant use	-0.10	-0.18	-0.02	0.04	0.020	2.22	0.030	
PROMIS PI	0.01	0.00	0.01	0.00	0.012	1.70	0.051	
TSK-11	-0.01	-0.01	0.00	0.00	0.006	2.37	0.098	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, neurovascular status, complications, opioid use, antidepressant use, grip strength %, PROMIS PI, PROMIS depression, PCS, PSEQ, TSK

PROMIS UE PF	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
Age	-0.15	-0.26	-0.04	0.06	0.009	4.61	0.06	
MS: Separated / Divorced / Widowed	-4.13	-8.01	-0.24	1.97	0.037	4.43	0.02	
SS: Partner / Friend(s) / Family	4.80	1.22	8.38	1.81	0.009	3.94	0.04	
WS: Unemployed	-5.87	-11.29	-0.45	2.74	0.034	1.76	0.03	
WS: Workers Compensation	-4.41	-8.94	0.12	2.29	0.050	2.03	0.03	
Complications	-4.09	-6.48	-1.70	1.21	0.001	1.42	0.07	0.66
Opioid use	-3.89	-6.21	-1.57	1.17	0.001	1.80	0.06	
Anti-depressant	-4.30	-7.10	-1.50	1.42	0.003	2.26	0.05	
PROMIS PI	0.23	0.07	0.40	0.083	0.005	1.77	0.07	
PROMIS Anxiety	0.13	0.02	0.24	0.06	0.026	2.24	0.07	
TSK-11	-0.44	-0.66	-0.23	0.11	0.000	2.49	0.14	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, complications, opioid use, antidepressant use, broad classification, grip strength %, PROMIS PI, PROMIS depression, PROMIS anxiety, PCS, PSEQ-2, TSK-11

Partial R^2 only shown for variables with $p < 0.05$

Table 7. Bivariate Analysis at 2-4 weeks

	QuickDASH		OSS		EQ5D Index Score		PROMIS UE PF	
	Value	**p-value**	**Value**	**p-value**	**Value**	**p-value**	**Value**	**p-value**
Age	0.2497	**<0.001**	-0.3061	**<0.001**	-0.1433	**0.0599**	-0.3052	**<0.001**
Sex								
Women	33.8 ± 24.1	0.1068	33.9 ± 11.5	0.1000	0.743 ± 0.279	0.2987	40.2 ± 9.5	0.4500
Men	26.8 ± 27.1		37.2 ± 10.8		0.793 ± 0.275		41.5 ± 10.9	
CACI	0.3751	**<0.001**	-0.4111	**<0.001**	-0.2484	**0.0010**	-0.3840	**<0.001**
Marital status								
Single	41 ± 26.1		31.2 ± 11.5		0.632 ± 0.331		38.2 ± 10.9	
Partner / Married	15.7 ± 16.7	**0.0000**	42.2 ± 7.2	**0.0000**	0.917 ± 0.145	**0.0000**	46 ± 8.7	**0.0000**
Separated / Divorced / Widowed	51 ± 18.1		25.8 ± 8.6		0.583 ± 0.264		33.9 ± 6	
Education	-0.2997	**0.0001**	0.3129	**0.0000**	0.1741	**0.0220**	0.2713	**0.0003**
Social support status								
Alone	55.7 ± 18.8		25.6 ± 8.6		0.503 ± 0.299		32.8 ± 6.6	
Partner / Friend(s) / Family	18.9 ± 18.7	**0.0000**	40.4 ± 8.9	**0.0000**	0.891 ± 0.166	**0.0000**	44.9 ± 9	**0.0000**
Full / Part-time care	48.9 ± 12.4		23.9 ± 7.2		0.604 ± 0.200		34.2 ± 4.7	
Work status								
Working	9.9 ± 11.1		44.4 + 4.7		0.952 ± 0.102		48.1 ± 7.9	
Homemaker	35.8 ± 31.3		33.1 + 14.4		0.601 ± 0.516		39.8 ± 12.8	
Retired	37.4 ± 22.9	**0.0000**	32.1 + 11	**0.0000**	0.719 ± 0.264	**0.0000**	38.4 ± 8.7	**0.0000**
Unemployed	52.8 ± 21.6		25.7 + 8.8		0.553 ± 0.275		34.4 ± 9.2	
Workers compensation	56.3 ± 18.5		25.8 + 8.4		0.545 ± 0.240		33.2 ± 6.9	
IMD Factor	-0.1967	**0.0097**	0.1588	**0.0374**	0.1689	**0.0267**	0.2002	**0.0084**
Broad injury classification								
Greater tuberosity	25.1 ± 26.2		38.7 ± 11.3		0.813 ± 0.303		44.4 ± 11	
2-Part	32.4 ± 24.4	0.1391	34.4 ± 11.1	**0.0443**	0.756 ± 0.267	0.3222	39.5 ± 9.1	**0.0260**
>2-Part	35.1 ± 24.7		33 ± 11.4		0.728 ± 0.274		39.5 ± 9.6	

Dominant side injured							
Yes	34.3 ± 25.7	0.1902	33.7 ± 11.8	0.1926	0.726 ± 0.302	0.1346	39.9 ± 10.1	0.3515
No	29.3 ± 24.1		35.9 ± 10.8		0.790 ± 0.246		41.3 ± 9.7	
High energy injury							
Yes	36.9 ± 27.3	0.3209	33.1 ± 13	0.4646	0.699 ± 0.327	0.3027	40.3 ± 11.4	0.9224
No	31.2 ± 24.7		35 ± 11.1		0.765 ± 0.270		40.6 ± 9.7	
Neurovascular compromise							
Yes	52.7 ± 27.5	**0.0587**	26.6 ± 11.2	0.1036	0.548 ± 0.363	**0.0885**	35.6 ± 11.9	0.2582
No	31.3 ± 24.7		35 ± 11.3		0.763 ± 0.274		40.7 ± 9.8	
Open injury							
Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Surgery							
Yes	39.3 ± 26.5	0.2007	31.3 ± 11.8	0.1871	0.671 ± 0.294	0.1805	37.4 ± 8.4	0.1728
No	31.1 ± 24.8		35.1 ± 11.3		0.766 ± 0.275		40.9 ± 10	
Complication							
Yes	51.2 ± 19.8	**0.0000**	26.2 ± 8.5	**0.0000**	0.546 ± 0.291	**0.0000**	33.5 ± 5.8	**0.0000**
No	25.5 ± 23.3		37.6 ± 10.8		0.826 ± 0.236		42.9 ± 9.9	
Prior dominant side fracture							
Yes	36.6 ± 28.1	0.2801	32.8 ± 12	0.3275	0.666 ± 0.371	0.2436	39.1 ± 10.8	0.3996
No	31 ± 24.4		35.1 ± 11.2		0.774 ± 0.254		40.8 ± 9.7	
Prior non-dominant side fracture							
Yes	37.6 ± 24.4	0.2989	32.6 ± 11.3	0.3784	0.686 ± 0.333	0.2402	37.8 ± 9.9	0.2068
No	31.2 ± 25.1		35 ± 11.4		0.765 ± 0.270		40.9 ± 9.9	
Opioid use							
Yes	44.2 ± 23.9	**0.0000**	29.9 ± 10.5	**0.0000**	0.620 ± 0.302	**0.0000**	35.9 ± 8.4	**0.0000**
No	20.9 ± 20.5		39.2 ± 10.3		0.879 ± 0.183		44.7 ± 9.3	
Anti-depressant use							
Yes	54.8 ± 15.3	**0.0000**	25.5 ± 6.8	**0.0000**	0.523 ± 0.257	**0.0000**	32.9 ± 5.9	**0.0000**
No	21 ± 21		39.2 ± 10.4		0.868 ± 0.211		44.2 ± 9.3	

Performance-based outcomes at t=1	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**
Grip strength (% non-injured side)	-0.3534	**0.0000**	0.3635	**0.0000**	0.3260	**0.0000**	0.3061	**0.0000**
Health-related outcomes at t=1	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**	**Coefficient**	**p value**
PROMIS Pain Interference	0.5950	**0.0000**	-0.5606	**0.0000**	-0.4996	**0.0000**	-0.6858	**0.0000**
PROMIS Depression	0.7116	**0.0000**	-0.6398	**0.0000**	-0.7090	**0.0000**	-0.6886	**0.0000**
PROMIS Anxiety	0.5366	**0.0000**	-0.4329	**0.0000**	-0.5460	**0.0000**	-0.5513	**0.0000**
PROMIS Emotional Support at t=1	-0.7091	**0.0000**	0.6308	**0.0000**	0.6644	**0.0000**	0.6707	**0.0000**
PROMIS Instrumental Support at t=1	-0.5739	**0.0000**	0.4718	**0.0000**	0.5690	**0.0000**	0.4885	**0.0000**
PCS	0.6615	**0.0000**	-0.5703	**0.0000**	-0.6838	**0.0000**	-0.5825	**0.0000**
PSEQ-2	-0.7345	**0.0000**	0.6922	**0.0000**	0.7776	**0.0000**	0.6975	**0.0000**
TSK-11	0.7451	**0.0000**	-0.6742	**0.0000**	-0.7439	**0.0000**	-0.7107	**0.0000**

Pearson correlation indicated by r; **bold** indicates statistically significant difference; continuous variables as mean (±standard deviation)

Table 8. Multivariable Analysis of Predictive Factors at less than a week of injury for limitations in function at 6-9 months

QuickDASH	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
MS: Separated / Widowed / Divorced	10.21	3.38	17.03	3.45	0.004	3.73	0.073	
SS: Partner / Friend(s) / Family	-7.59788	-14.31	-0.88	3.40	0.027	3.88	0.036	
WS: Unemployed	13.53	2.88	24.19	5.39	0.013	1.81	0.052	
WS: Workers compensation	16.14	7.47	24.80	4.38	0.000	2.01	0.088	
Complications	6.86	2.04	11.67	2.44	0.006	1.52	0.056	0.81
Antidepressant use	11.37	5.37	17.36	3.03	0.000	2.83	0.092	
PROMIS PI	0.64	0.22	1.07	0.22	0.003	2.31	0.058	
PROMIS IS	0.44	0.12	0.77	0.17	0.008	3.49	0.035	
PSEQ-2	-2.94	-4.19	-1.69	0.63	0.000	3.78	0.124	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, neurovascular status, complications, opioid use, antidepressant use, grip strength %, PROMIS PI, PROMIS IS, PSEQ-2

OSS	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
MS: Partner / Married	5.14	1.56	8.72	1.81	0.005	4.89	0.032	
MS: Separated / Widowed / Divorced	-3.89	-7.27	-0.50	1.71	0.025	4.00	0.072	
SS: Full / Part-time care	-4.93	-8.80	-1.06	1.96	0.013	1.83	0.067	
WS: Unemployed	-7.31	-12.39	-2.23	2.57	0.005	1.79	0.063	
WS: Workers compensation	-7.72	-11.87	-3.56	2.10	0.000	2.02	0.104	0.77
Complications	-3.99	-6.29	-1.69	1.16	0.001	1.51	0.089	
Antidepressant use	-5.23	-8.12	-2.34	1.46	0.000	2.83	0.079	
PROMIS IS	-0.38	-0.54	-0.22	0.08	0.000	2.31	0.134	
PSEQ-2	1.73	1.13	2.33	0.31	0.000	3.84	0.249	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, complications, opioid use, antidepressant use, broad classification, grip strength %, PROMIS PI, PROMIS IS, PSEQ-2

EQ-5D-3L	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
SS: Partner / Friend(s) / Family	0.10	0.02	0.19	0.04	0.021	3.88	0.110	0.71
WS: Homemaker	-0.15	-0.27	-0.02	0.06	0.023	1.41	0.025	
Complications	-0.09	-0.15	-0.02	0.03	0.009	1.52	0.039	
PSEQ-2	0.06	0.05	0.08	0.01	0.000	3.78	0.377	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, neurovascular status, complications, opioid use, antidepressant use, grip strength %, PROMIS PI, PROMIS IS, PSEQ-2

PROMIS UE PF	Regression Coefficient	95% Confidence Interval		Standard Error	p-value	VIF	Partial R^2	Adjusted R^2
Variables								
PROMIS PI	-0.59	-0.79	-0.38	0.11	0.000	2.31	0.242	0.70
PSEQ-2	1.15	0.54	1.76	0.31	0.000	3.84	0.266	

In model: age, marital status (MS), social status (SS), education, work status (WS), IMD, complications, opioid use, antidepressant use, broad classification, grip strength %, PROMIS PI, PROMIS IS, PSEQ-2

Only partial R^2 of significant values is displayed (i.e. $p<0.05$)