

Patient-Reported Outcome Measures in Adults with Traumatic Hand Injury: A Systematic Review

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INTRODUCTION

- Traumatic hand injuries are common (up to 28.6% of all injuries)¹
- Hand injuries range from simple lacerations and fractures, to complex and disabling damage of tendons, nerves and bone structure, to crush injuries, burns and amputations
- Functional loss during recovery and permanent loss of function (including ADLs & IADLs) can lead to significant disability and reduction in quality of life
- There is a large economic impact of hand injuries to the healthcare system, patients and third-party payers
- Traditionally, the success of surgery was assessed based on post-surgical range of motion, grip strength, morbidity and complication. However, the outcomes research movement has recommended the use of patient-reported outcome measures (PROM) (eg. visual analogue scale for pain, SF-36, DASH, etc.)
- Some important questions remain to be answered, bringing to light a salient KNOWLEDGE GAP
 - How do we know if we are assessing appropriate and meaningful constructs post-hand surgery and rehabilitation?
 - How do we know if the PROMs being used are valid in the hand injury population?
- Lacking this information, evidence from PROMs can never translate to the clinical decision-making process, since we are not equipped to confidently assess the factors that influence post-surgery recovery and satisfaction. The result is a patient entering the chronic disability and pain cycle.

LEARNING OBJECTIVES:

- To identify the validated PROMs in the hand trauma population
- To report on their psychometric properties
- To outline the scope of these PROMs
- To offer recommendations on which PROMs to use in clinical practice and research

METHODS

- A combination of Medical Subject Headings (MeSH) terms (where applicable) and keywords were used to search all articles.

Inclusion Criteria	
1) Studies reporting on adults (18 years of age or older) with hand trauma	
2) Studies reporting on validated PROMs	
3) Studies reporting on any combination of these psychometric findings: internal consistency, test-retest, criterion/construct validity, and responsiveness	
4) All study designs published in English-language peer-reviewed journals	
Exclusion Criteria	
1) Studies reporting exclusively on patients with trauma elsewhere in the body or with non-traumatic causes for hand disability and reduction in function (e.g. degenerative diseases, repetitive use injuries, vascular diseases, etc.)	
2) Studies reporting on additional populations other than hand trauma where the proportion of hand trauma patients was not explicitly noted	
3) Reviews, letters to the editor and conference abstracts	

Table 1: Inclusion & Exclusion Criteria

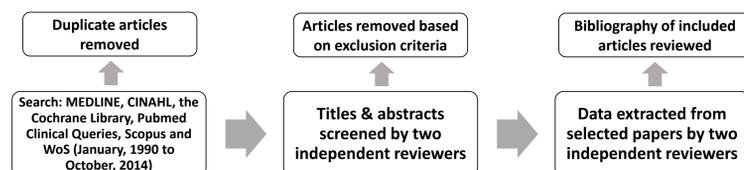


Figure 1: Methodology following literature search

RESULTS

- The search yielded 416 hits; 7 studies were eligible for full review.
- A total of 8 PROMs were found to be validated in the hand trauma population: Disability of the Arm, Shoulder and Hand (DASH), Manchester-Modified Disability of the Arm, Shoulder and Hand (M2DASH), QuickDASH, Michigan Hand Outcomes Questionnaire (MHQ), Cold Intolerance Symptom Severity questionnaire (CISS), Cold Sensitivity Severity questionnaire (CSS), Injured Workers Survey (IWS), and the Hand Assessment Tool (HAT).
- Table 2 details the psychometric properties of each PROM. Table 3 identifies the scope of domains addressed by each PROM.

Outcome Measure	Validity		Test-Retest Reliability (95% CI)	Internal Consistency: Cronbach's Alpha	Responsiveness (95% CI)
	Criterion validity	Construct validity			
DASH	✓		ICC = 0.96	0.95	Effect size = 0.67 (0.41, 1.08) SRM = 0.86 (0.60, 1.20)
QuickDASH	✓			0.88	
M ² DASH	✓	✓	No significant change Mean change = -0.2 (-0.84, 0.44).		Effect size (between presentation and discharge) = 1.45 Effect size (between discharge and 6 mo. follow-up) = 1.07 SRM = 2.21
MHQ	✓				Effect size = 0.84 (0.61, 1.18) SRM = 1.05 (0.78, 1.42)
					Effect size (between presentation and discharge) = 1.23 Effect size (between discharge and 6 mo. follow-up) = 0.6 SRM = 1.50
Cold Intolerance Symptom Severity		✓	No significant change ICC = 0.92 (0.89, 0.95)	0.91	
Cold Sensitivity Severity Scale		✓	No significant change ICC = 0.85 (0.79, 0.90)	0.88	
Injured Workers Survey	✓				>4 of the first 8 items positive Sensitivity = 95% Specificity = 58% Item 4 or 5 positive Sensitivity = 91% Specificity = 63% >4 of the first 8 items positive AND Item 4 or 5 positive Sensitivity = 89% Specificity = 74%
Hand Assessment Tool		✓	CCC = 0.73 (0.60, 0.83).	0.91	

ICC: Intraclass Correlation Coefficient SF-36: Short Form-36 Questionnaire
SRM: Standardized Response Mean CCC: Concordance Correlation Coefficient
PEM: Patient Evaluation Measure

Table 2: Psychometric Properties for Validated PROMs in Hand Trauma

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Outcome Measure	DASH	QuickDASH	M ² DASH	MHQ	Cold Intolerance Symptom Severity	Cold Sensitivity Severity Scale	Injured Workers Survey	Hand Assessment Tool
Overall Hand Function				✓				
Hand symptoms (ie. pain, cold sensitivity)	✓	✓	✓	✓	✓	✓		✓
Activities of Daily Living	✓	✓	✓	✓	✓		✓	✓
Occupational Performance	✓	✓	✓	✓				
Satisfaction				✓				
Aesthetics				✓				✓
Social Function	✓	✓	✓					
Leisure							✓	✓
Sleep	✓	✓	✓					
Confidence	✓	✓	✓					
Psychological							✓	
Other patient factors							✓	

Table 3: Scope of Validated PROMs in Hand Trauma

DISCUSSION

One of the critical factors when choosing an outcome measure(s) in a research or a clinical setting, is whether the measure has strong evidence for its psychometric integrity in the observed population. Based on both comprehensive and favourable psychometric evidence, we recommend that the DASH, MHQ, CSS, CISS, and/or the IWS are acceptable PROMs in all hand trauma patients; these results apply equally to research and clinical settings. The domains of the DASH and MHQ encompass a broad scope, and thus at least one of these PROMs should be considered in this population; the CSS, CISS, and/or the IWS should be considered when appropriate.

However, of the validated questionnaires, critical data regarding reliability and responsiveness are missing. Moreover, none of these PROMs offer a comprehensive measurement of hand trauma outcomes. Other available PROMs (e.g. Potential Work Exposure Scale, Modified Mayo Wrist Scale, etc.) may have a role in this topic, however they cannot be considered without adequate validation in the hand trauma population. Clearly, further research is indicated to identify the available PROMs in the hand trauma population and provide full psychometric analysis.

Measuring the disability associated with hand injury is important to elucidate the burden of these conditions. Identifying high-risk patients early through the use of PROMs can allow for early intervention to decrease pain intensity and disability, increase quality of life, improve surgical outcomes, optimize healthcare resources, and prevent the transition to chronic pain syndromes.

References

- Packer, G. J., Shaheen, M. A. Patterns of hand fractures and dislocations in a district general hospital. *J Hand Surg Eur.* 1998;18(4):511-514.

Disclosures: None to declare
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