

# Upper Extremity Outcome Measures

## Goals and Objectives

### Course Description

"Upper Extremity Outcome Measures" is a live (real-time) interactive webinar for occupational therapists and occupational therapy assistants that examines tests and measures to assess patient outcomes for common pathologies of the upper extremity. This course includes a review of current literature relating to performance and patient reported measures including indications, scoring, and analysis of psychometric properties.

### Course Rationale

The purpose of this course is to enhance clinical decision making when selecting outcome measures for musculoskeletal and neuromuscular pathologies of the upper extremity. The emphasis is comparative analysis of contemporary instruments to assess impairments and function of the shoulder, elbow, wrist and hand in adult and pediatric populations.

### Course Goals and Objectives

Upon completion of this course, participants will be able to:

1. Define psychometric properties of standardized health-related outcome measures.
2. List global and specific domains that can be assessed with outcome measures.
3. Differentiate between patient or proxy reported and performance-based measures.
4. Identify advantages of and barriers to patient reported outcomes assessed through computer adaptive testing.
5. Identify the clinical relevance of performance measures to quantify impairments and function of the shoulder, elbow, wrist and hand.
6. Select reported outcome measures for the upper extremity.
7. Define scoring procedures and values for specific upper extremity outcome measures.
8. Identify upper extremity outcome measures appropriate for the pediatric population.
9. Identify upper extremity outcome measures appropriate for individuals with neuromuscular disorders.
10. List tests and measures to assess readiness for return to sport and work following rehabilitation for upper extremity pathology.

**Course Provider** – Innovative Educational Services

**Provider Contact Information** – [information@cheapceus.com](mailto:information@cheapceus.com)

**Course Instructor** - Jodi Gootkin, PT, MEd, CEAS

**Conflict of Interest** – No financial or non-financial conflict of interest exists for the presenter or provider of this course.

**Target Audience** – Occupational Therapists, Occupational Therapy Assistants

**Course Educational Level** – This course is applicable for introductory learners.

**Course Prerequisites** – None

**Method of Instruction** – Live synchronous interactive webinar

**Location** - Cheapceus.com

**Date** – Multiple presentation dates.

**Course Completion Requirements / Criteria for Issuance of CE Credits** – Verified attendance at live interactive webinar and a score of 70% or greater on the course post-test

**Continuing Education Credits** – Three (3) contact hours / .3 AOTA CEUs

**Course Fee** - \$39.95

**Registration Information** – Learners may register for this PD activity by going to: [cheapceus.com](http://cheapceus.com)

**Special Needs Requests** – Email: [information@cheapceus.com](mailto:information@cheapceus.com) or phone: 954-663-4101

**Cancellation by the Learner** – Learners may cancel their participation at any time and receive a full refund of all paid fees.

**Cancellation by the Provider** – Cancellation by the provider will result in an immediate full refund to the registrant of all fees paid.

**Complaint Resolution** – Please call 954-663-4101 (24 hours/day, 7 days/week) to speak with a live customer service agent. Our goal is to work with our customers to resolve all issues to the customer's satisfaction with just one phone call whenever possible.

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.



Innovative Educational Services is an AOTA Approved Provider of professional development. PD activity approval ID# 5471. This Distance Learning – Interactive PD activity is offered at .3 CEUs; Introductory; Occupational Therapy Service Delivery; OT Foundational knowledge. The assignment of AOTA CEUs does not imply endorsement of specific course content, products, or clinical procedures by AOTA.

## Upper Extremity Outcome Measures

### Course Outline and Schedule

Topic	Time
Value of Tests and Measures	0:00-0:15
Psychometric Properties	0:16-0:30
Types of Instruments and Domains	0:31-0:40
Upper Extremity Performance Measures	0:41-0:50
Interactive Discussion of Clinical Applications	0:51-1:00
Mobility and Activity Assessments	1:01-1:20
Upper Extremity Patient Reported Measures	1:21-1:50
Interactive Discussion of Clinical Applications	1:51-2:00
Pediatric Specific Tools	2:00-2:20
Return to Sport Performance Testing	2:21-2:40
Return to Work Assessments	2:41-2:50
Interactive Discussion of Clinical Applications	2:51-3:00

# UPPER EXTREMITY OUTCOME MEASURES

Live Interactive Webinar  
Presented By  
Jodi Gootkin, PT, MEd, CEAS  
jodiemail@comcast.net

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## Course Rationale

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## Goals and Objectives

1. Define psychometric properties of standardized health-related outcome measures.
2. List global and specific domains that can be assessed with outcome measures.
3. Distinguish between patient or proxy reported and performance-based measures.
4. Identify advantages of and barriers to patient reported outcomes assessed through computer adaptive testing.
5. Detail the clinical relevance of performance measures to quantify impairments and function of the shoulder, elbow, wrist and hand.
6. Compare and contrast patient reported outcome measures for the upper extremity.
7. Describe scoring procedures and values for specific upper extremity outcome measures.
8. Identify upper extremity outcome measures appropriate for the pediatric population.
9. Identify upper extremity outcome measures appropriate for individuals with neuromuscular disorders.
10. List tests and measures to assess readiness for return to sport following rehabilitation for upper extremity pathology.

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## Disclaimer

- Application of concepts presented in this webinar is at the discretion of the individual participant in accordance with federal, state, and professional regulations.
- No conflict of interest exists for the presenter or provider of this course.

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## Course Outline and Schedule



Topic	Time
Value of Tests and Measures	0:00-0:15
Psychometric Properties	0:16-0:30
Types of Instruments and Domains	0:31-0:40
Performance Measures	0:41-0:50
<b>Interactive Discussion of Clinical Applications</b>	<b>0:51-1:00</b>
Performance Measures	1:01-1:20
Activity Assessments	1:21-1:30
Patient Reported Measures	1:31-1:50
<b>Interactive Discussion of Clinical Applications</b>	<b>1:51-2:00</b>
Patient Reported Measures	2:00-2:30
Pediatric Specific Tools	2:31-2:40
Return to Sport Performance Testing	2:41-2:50
<b>Interactive Discussion of Clinical Applications</b>	<b>2:51-3:00</b>

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## Course Post Test

- Slides with "Consider This" icon in bottom right corner will be helpful in completing the post-test.



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## Value of Tests and Measures

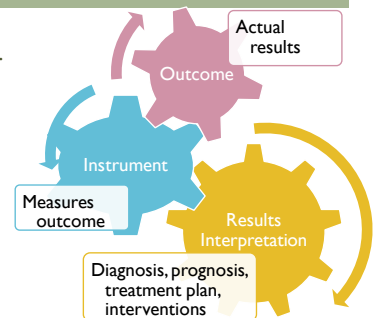
- Assist in establishing plan of care and quantifying progress.
- Serve as foundation to engage patient and caregivers.
- Standardize communication among health care professionals.
- Justify services and reimbursement.

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## Outcome Measures

- Objectively assess individual.
- Evaluate quality and determine relevance of research to support evidence-based practice.

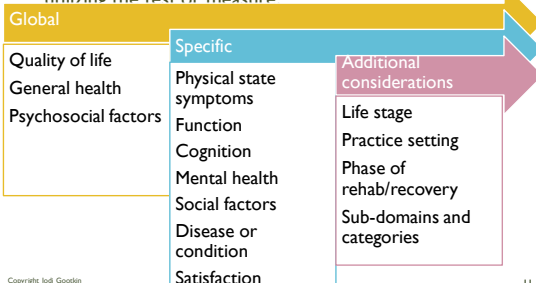


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## Instrument Domains

- Specific category of information to be gathered by utilizing the test or measure



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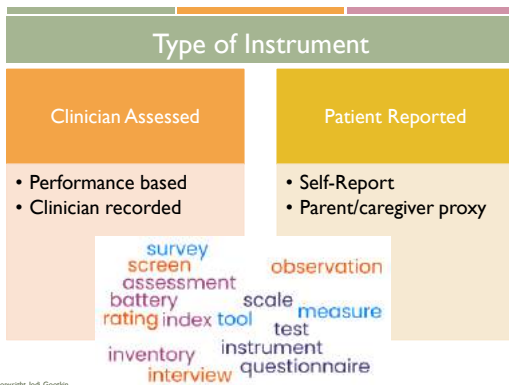
## Functional Measurement

- What type of tool provides the most beneficial information to guide clinical decision making?
- Performance measured by clinician, patient reported or mixed?



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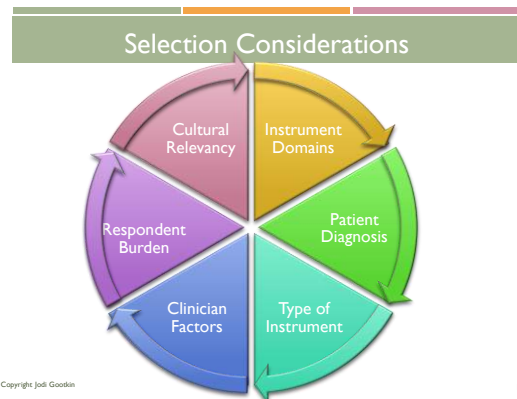
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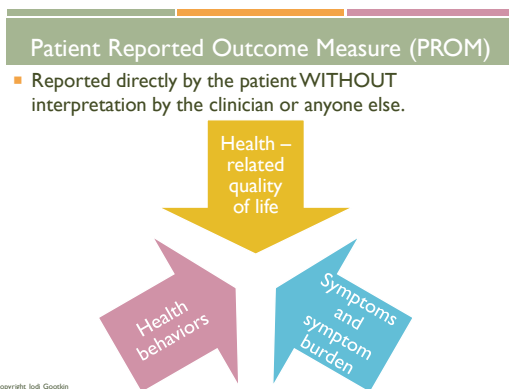
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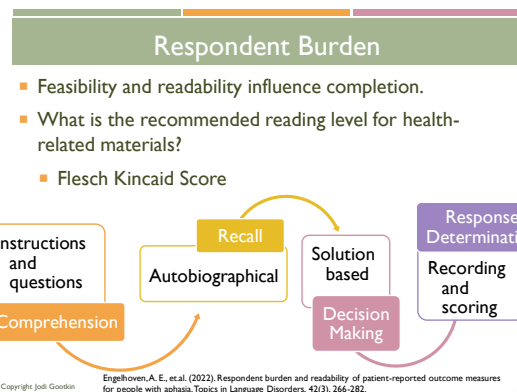
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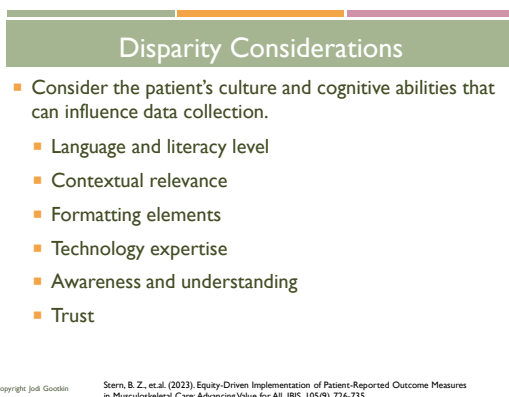
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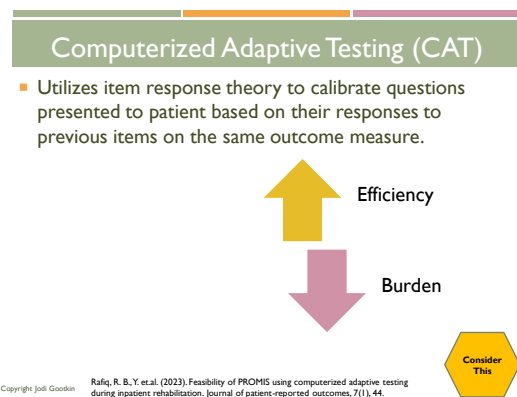


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Stern, B. Z., et al. (2023). Equity-Driven Implementation of Patient-Reported Outcome Measures in Musculoskeletal Care: Advancing Value for All. *JGIM*, 105(9), 726-735.

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Rafiq, R. B., et al. (2023). Feasibility of PROMIS using computerized adaptive testing during inpatient rehabilitation. *Journal of patient-reported outcomes*, 7(1), 44.

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## Psychometrics

- Characteristics of measures utilized to determine their effectiveness and trustworthiness.

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## Psychometric Properties

### Validity

Measures what is intended



### Reliability

Consistent over time

Intra-rater	Inter-rater	Test-retest
• Same tester	• Different testers	• Patient over time

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## Sensitivity - Responsiveness



**PASS** Patient Acceptable Symptom State Patient satisfied



**SCB** Substantial Clinical Benefit Optimal improvement



**MCID** Minimal Clinically Important Difference Patient perceived meaningful change



**MDC** Minimal Detectable Change Smallest change not from error

**SEM** Standard Error Measurement Value attributed to error

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## Bench to Bedside



### Facilitators

- Evidence and knowledge
- Colleague support
- Ease of application
- Technology

### Obstacles

- Lack of time
- Knowledge of measures
- Technology
- Patient response

Smith, D., et al. (2022). Perception and utilization of standardized outcome measures in acute care physical therapy: an analysis of practice. *Journal of Acute Care Physical Therapy*, 13(4), 174-181.  
Gauthier, M. L., et al. (2023). Missing The Forest For The Trees: A Lack Of Upper Extremity Physical Performance Testing In Sports Physical Therapy. *International Journal of Sports Physical Therapy*, 18(2), 419.

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## COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN)

- Provides standards for assessing methodological quality of studies that examine psychometric properties of health-related outcome measures.
- The goal of COSMIN is to enhance the selection of appropriate instruments to be consistently used in research and clinical practice.
- Conversely, de novo measures are new and not based on any existing measures.

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COSMIN, <https://www.cosmin.nl/>

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## Categories of Measures

- Performance
  - Clinician Assessment
  - May include Patient Response Portions
- Activity
  - Clinician Administered
- Patient Reported Outcome Measures
  - Patient Response Questionnaires
- Pediatric Specific
- Return to Sport

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## PERFORMANCE MEASURES

### Clinician with Patient Report Section

- Constant-Murley Score (CMS)
- UCLA Shoulder Scale
- American Shoulder and Elbow Surgeons Shoulder (ASES)

### Clinician

- Fugl-Meyer Assessment – Upper Extremity (FMA-UE)
- Perdue Pegboard Test (PPT)

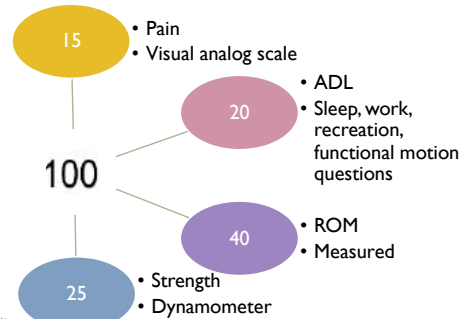
Objective, clinician administered tools indicated for assessing baseline, progress, and degree of disability.

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## Constant-Murley Score (CMS)



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## CMS Research

Cohort	Psychometrics
SLAP-II Surgical Management	3 months too early for outcome assessment
Reverse Shoulder Arthroplasty	MCID 3 6 12 months post-op 7 7 9 respectively
Calcific Rotator Cuff Tendonitis	MCID 10 points SCB 20 points

Slane, O., et al. (2021). Responsiveness of five shoulder outcome measures at follow-ups from 3 to 24 months. *BMC Musculoskeletal Disorders*, 22, 1-10.  
Zhou, A., et al. (2023). Minimal Clinically Important Differences for Oxford, Constant, and University of California Los Angeles Shoulder Scores After Reverse Shoulder Arthroplasty to Allow Interpretation of Patient-Reported Outcome Measures and Future Statistical Power Analyses. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 39(6), 1405-1414.  
Louwrens, J. K., et al. (2020). Quantifying the minimal and substantial clinical benefit of the Constant-Murley score and the Disabilities of the Arm, Shoulder and Hand score in patients with calcific tendinitis of the rotator cuff. *JSES International*, 4(3), 606-611.

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## University of California Los Angeles (UCLA) Shoulder Scale



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## UCLA Shoulder Scale Research

Cohort	Psychometric Property
Reverse Shoulder Arthroplasty	MCID 3 6 12 month post-op 4 3 3 points respectively
Arthroscopic Cuff Repair	MCID 10 anchor approach 3 distribution approach
Reverse Shoulder Arthroplasty	PASS total score thresholds 3 6 12 months post-op 17 21 26 points respectively

Zhou, A., et al. (2023). Minimal Clinically Important Differences for Oxford, Constant, and University of California Los Angeles Shoulder Scores After Reverse Shoulder Arthroplasty to Allow Interpretation of Patient-Reported Outcome Measures and Future Statistical Power Analyses. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 39(6), 1405-1414.  
Yang, C., et al. (2024). Determining patient acceptable symptom states from patient reported outcome measures following reverse shoulder arthroplasty: Constant-murley, UCLA, Oxford Shoulder Scores. *Journal of Orthopaedics*, 54, 143-147.  
Makadem, A. A., et al. (2024). Estimating the minimal clinically important difference of shoulder functional scores after arthroscopic rotator cuff repair: a prospective study. *Archives of Orthopaedic and Trauma Surgery*, 1-9.

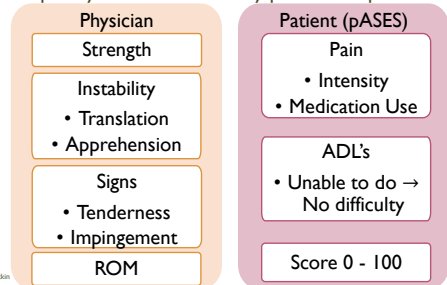
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## American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES)

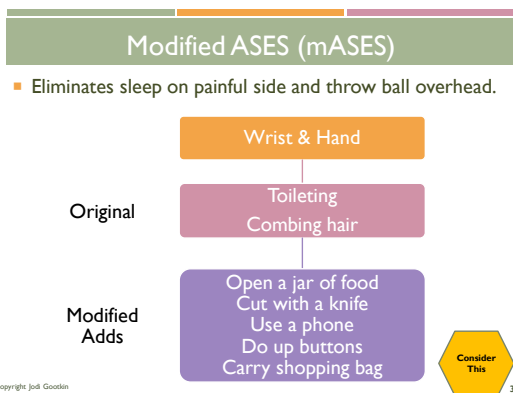
- Contemporary version utilizes only patient component.



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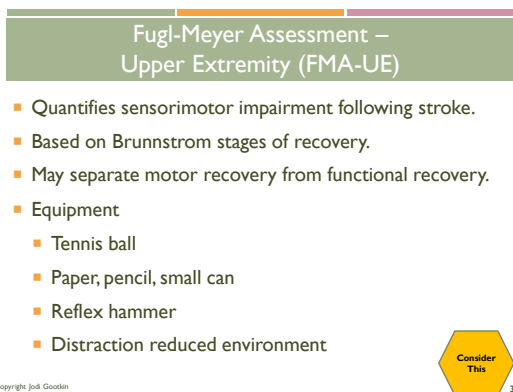
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### pASES Research

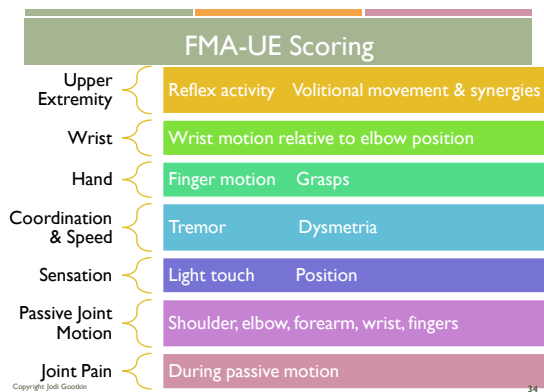
Cohort	Psychometrics	
Rotator Cuff Repair	Non-operative MCID	12 – 17
	Operative	27
	Maximum Possible Improvement	>50% of value
	MCID	19
Superior Capsule Reconstruction	Substantial Clinical Benefit	28
	Patient Acceptable Symptom State	81

Agel, J., et al. (2023). American Shoulder and Elbow Surgeons score: what does it tell us about patients selecting operative treatment of a rotator cuff injury? JSES International, 7(5), 751-755.  
Yeom, J., et al. (2022). Patient acceptable symptom state, minimal clinically important difference, and substantial clinical benefit after arthroscopic superior capsular reconstruction. The American Journal of Sports Medicine, 50(12), 3308-3317.

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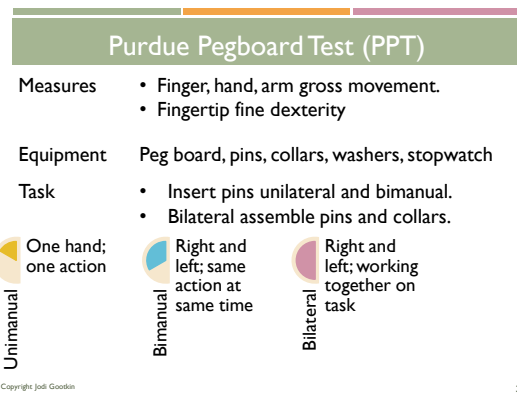
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### FMA-UE Research

Cohort	Psychometrics
Moderate to severe hemiparesis during acute to subacute phase	MDC 7 MCID 13
Chronic moderate to severe impairment	Valid with appropriate item difficulty Hook grasp may be misfit item

Huynh, B. P., et al. (2023). Sensitivity to Change and Responsiveness of the Upper Extremity Fugl-Meyer Assessment in Individuals With Moderate to Severe Acute Stroke. Neurorehabilitation and Neural Repair, 37(8), 545-553.  
Hijikata, N., et al. (2020). Item difficulty of Fugl-Meyer assessment for upper extremity in persons with chronic stroke with moderate-to-severe upper limb impairment. Frontiers in neurology, 11, 577855.

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## Perdue Pegboard Test Scoring

- Pin Placement – number in 30 seconds
  - Right Hand
  - Left Hand
  - Both Hands
- Assembly
  - Pin + Washer + Collar + Washer = 32 points
- Age-referenced Norms

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## Perdue Pegboard Research

Cohort	Psychometrics
Ischemic Stroke	Valid to distinguish dexterity impairment in individuals with hand injuries.  Post stroke, bimanual tasks elicited greater activation of bilateral sensorimotor cortices and contralesion hemisphere.

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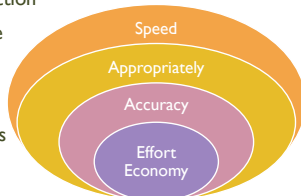
Chen, S., et al. (2024). Cortical activity in patients with high-functioning ischemic stroke during the Purdue Pegboard Test: insights into bimanual coordinated fine motor skills with functional near-infrared spectroscopy. *Neural Regeneration Research*, 19(5), 1098-1104.

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## Hand Function Tool Selection

- Consider information to be gathered.
  - Dexterity vs. Hand Function
  - Efficiency vs. Grasp Type
  - Completion vs. Quality
  - Functional Activities
  - Environmental Demands



Yong, J., et al. (2022). Performance-based outcome measures of dexterity and hand function in person with hands and wrist injuries: A scoping review of measured constructs. *Journal of Hand Therapy*, 35(2), 200-214.  
Hahn, A., et al. (2022). Aid for Decision Making in Occupation Choice (ADOC) as a Tool to Address Activities and Participation: A Scoping Review. *Malaysian Journal of Medicine & Health Sciences*, 18.

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## ACTIVITY ASSESSMENTS

- Canadian Occupational Performance Measure (COPM)
- Activity Measure For Post-acute Care (AM-PAC)

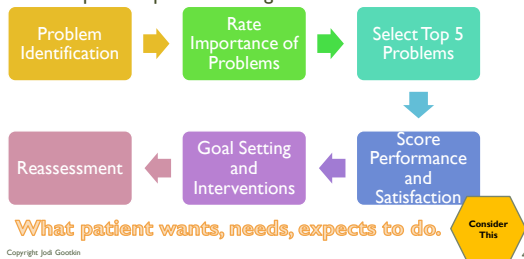
Clinician administered tools to gather information on functional activities.

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## Canadian Occupational Performance Measure (COPM)

- Personalized semi-structured interviewing identifies occupational performance goals.



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## COPM Problem Identification

- Young children may not be capable of self-evaluating.

Self-care	Productivity	Leisure
<ul style="list-style-type: none"> <li>Personal care</li> <li>Functional mobility</li> <li>Community management</li> </ul>	<ul style="list-style-type: none"> <li>Work</li> <li>Household</li> <li>Play/school</li> </ul>	<ul style="list-style-type: none"> <li>Quiet recreation</li> <li>Active recreation</li> <li>Socialization</li> </ul>

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Verkerk, G., et al. (2023). Instructions for administering the Canadian occupational performance measure with children themselves. *Physical & Occupational Therapy in Pediatrics*, 43(1), 58-73.  
Law, M., et al. (2014). *Canadian Occupational Performance Measure* (5th ed.). CAOT Publications.

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## COPM Scoring

- Individualized scoring and not norm referenced.
- Responsiveness values vary by individual, problems, and context.
- Mean score may indicate negative change which may not actually indicate a change in abilities.
  - Patient insight and awareness may alter scoring.

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## COPM Research

Cohort	Psychometrics
Dupuytren Disease	107 performance problems Greater responsiveness than QuickDASH
Cancer Survivors	100 performance problems Chronic cognitive, emotional, psychosocial impacts

Lauritzen, A., et al. (2023). Responsiveness of the patient-specific Canadian occupational performance measure and a fixed-item activity limitations measure in patients with dupuytren disease. *Journal of Patient-Reported Outcomes*, 7(1), 1-8.  
Winters, C.A., et al. (2024). Does the Canadian Occupational Performance Measure (COPM) capture the complex experiences of cancer survivors? A mixed methods approach. *Occupational Therapy in Health Care*, 38(2), 347-363.

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## Activity Measure for Post-Acute Care (AM-PAC)

- Assess patient across care settings utilizing form versions.
- Items correlate to PROMIS Upper Extremity



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Thackeray, A., et al. (2021). Linking AM-PAC mobility and daily activity to the PROMIS physical function metric. *Physical Therapy*, 101(8), pzab084.

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## PATIENT REPORTED OUTCOME MEASURES

- Disabilities of the Arm, Shoulder, and Hand (DASH)
- Shoulder Pain and Disability Index (SPADI)
- Wheelchair Users Shoulder Pain Index (WUSPI)
- Simple Shoulder Test (SST)
- Penn Shoulder Score
- Western Ontario Rotator Cuff Index (WORC)
- Michigan Hand Outcomes Questionnaire (MHQ)

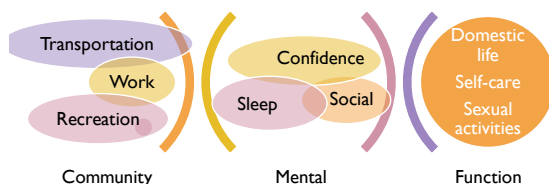
Patient's subjective assessment of their functional abilities.

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## Disabilities of the Arm, Shoulder, and Hand (DASH)

- Entire upper limb disability and symptoms.
  - Pain, sensation, weakness, stiffness
- Optional work and sports specific sections.



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## DASH Scoring

- Mathematical calculation with resultant score higher value indicating greater disability.
- Normative value for healthy population is 10.
- MCID ranges from 4 to 15.
- QuickDASH utilizes a shortened question list to avoid redundancy in domains assessed.

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## DASH Research

Cohort	Psychometrics
Lateral Elbow Tendinopathy	SEM 4 MCID 9
Ulnar Nerve Entrapment	Larger effect size than biomechanical measures and progressively increases >3 months post surgery
Orthopedic and Neurologic Wrist and Hand Disorders	Responsive for carpal tunnel, hand rheumatoid arthritis and trauma.

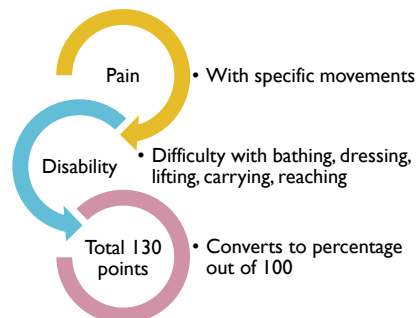
Chaloumas, D., et al. (2023). Determining minimal important differences for patient-reported outcome measures in shoulder, lateral elbow, patellar and Achilles tendinopathies using distribution-based methods. *BMC Musculoskeletal Disorders*, 24(1), 1-8.  
Dabagh, A., et al. (2022). Psychometric Properties of the Patient-Reported Outcome Measures for People With Ulnar Nerve Entrapment at the Elbow: A Systematic Review. *Physical Therapy*, 102(10), p2403.  
Zelbari, C., et al. (2023). Patient-reported outcome measures used for hand and wrist disorders: An overview of systematic reviews. *Journal of Hand Therapy*.

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## Shoulder Pain and Disability Index (SPADI)



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## SPADI Research

Cohort	Psychometrics
Adhesive Capsulitis	For pain and disability subscales SEM 2 MDC 6

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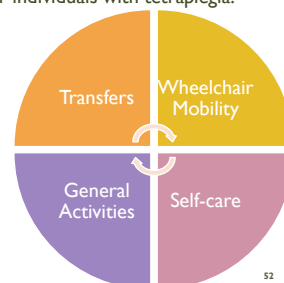
Venturini, D., et al. (2023). Reliability and validity of the Shoulder Pain and Disability Index in a sample of patients with frozen shoulder. *BMC Musculoskeletal Disorders*, 24(1), 1-9.

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## Wheelchair Users Shoulder Pain Index (WUSPI)

- Measures pain interference.
- VAS may be challenging for individuals with tetraplegia.



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## WUSPI Research

Cohort	Psychometrics
Female Wheelchair Basketball Players	Strongly associated with point tenderness in bicipital groove, positive speed test, and limited shoulder abduction ROM.

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Tsumoda, K., et al. (2021). Associations between wheelchair user's shoulder pain index and tendinitis in the long head of the biceps tendon among female wheelchair basketball players from the Japanese national team. *Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology*, 24, 29-34.

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## Simple Shoulder Test (SST)

- Dichotomous response scale for questions regarding function, pain, strength and range of motion

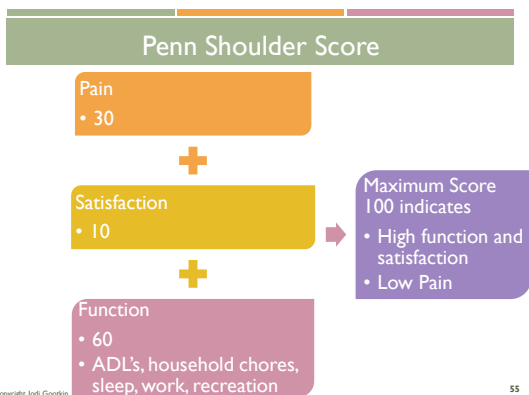


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### Penn Shoulder Score Research

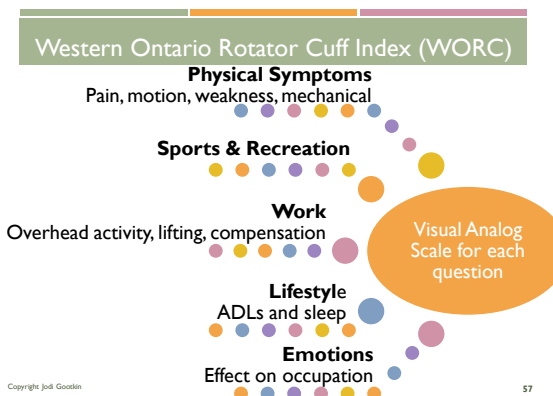
Cohort	Psychometrics
Systematic Review	MDC 12 points on total score
	Unclear cross-cultural appropriateness

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Evans, N.A., et al. (2023). A systematic review of the measurement properties of the Pennsylvania Shoulder Score. *Journal of Hand Therapy*.

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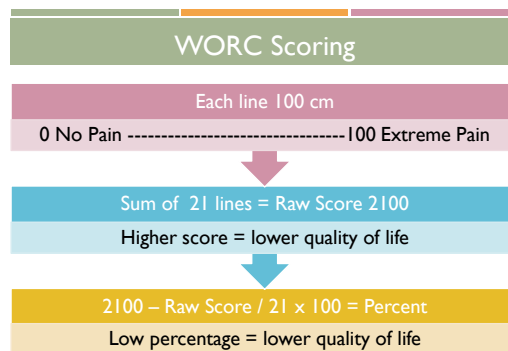
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### WORC Research

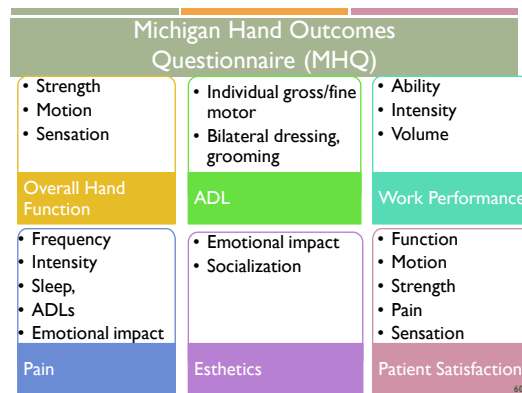
Cohort	Psychometrics
Healthy Shoulders Normative Data	BMI, tobacco, history shoulder pathology yielded worse scores.
	Subscale scores may be more valuable clinically.

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Kemp, S.E., et al. (2020). Normative values of the Western Ontario Rotator Cuff (WORC) Index for the general population in the USA. *Journal of ISAKOS*, 5(3), 264-268.

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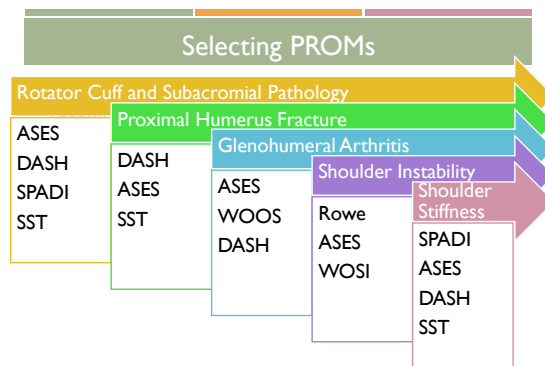
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MHQ Research	
Cohort	Psychometrics
Ulnar Nerve Entrapment	Excellent discrimination on patient satisfaction,
Orthopedic and Neurologic Wrist and Hand Disorders	Good content validity and responsiveness for carpal tunnel syndrome and trauma.

Dabbagh, A., et al. (2022). Psychometric Properties of the Patient-Reported Outcome Measures for People With Ulnar Nerve Entrapment at the Elbow: A Systematic Review. *Physical Therapy*, 102(10), pasc103  
Ziebart, C., et al. (2023). Patient-reported outcome measures used for hand and wrist disorders: An overview of systematic reviews. *Journal of Hand Therapy*.

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Padua, R., et al. (2021). Choosing patient-reported outcome measures for shoulder pathology. *EFORT Open Reviews*, 6(9), 779-787.

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### PEDIATRIC SPECIFIC TOOLS

- Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH)
- Pediatric Adolescent Shoulder Survey (PASS)
- Performance of Upper Limb Tool (PUL)

Combination of performance, clinical and patient reported measures suggested.

Consider This

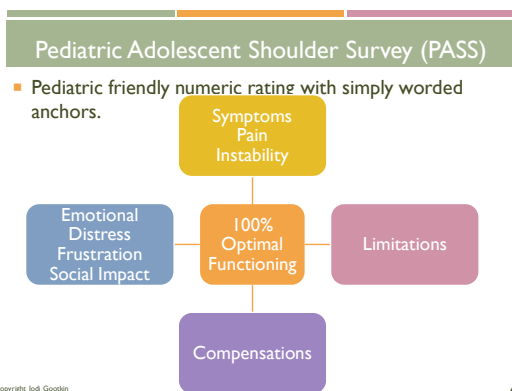
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QuickDASH	
<ul style="list-style-type: none"> <li>Omits adult-specific questions.</li> <li>Proxy completion may be necessary for children particularly under 8 years old.</li> <li>High score = Maximum disability</li> </ul>	
Cohort	Psychometrics
Pediatric Upper Limb Fractures	Not validated for patients under 18 years old.

Alberghina, F., et al. (2022). Review of pediatric functional outcomes measures used to evaluate surgical management in pediatric patients with an upper extremity fracture. *Journal of Pediatric Orthopaedics B*, 31(3), 260-269.

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PASS Research	
Cohort	Psychometrics
Shoulder Instability Surgery	MDC 13 points
	MCID at least 17 points
	SCB total score at least 85

Walls-Lang, K., et al. (2023). Assessment of Thresholds for Clinically Relevant Change in the Pediatric Adolescent Shoulder Survey After Shoulder Instability Surgery: Factors Associated With Meaningful Improvement in Outcomes. *Orthopaedic Journal of Sports Medicine*, 11(9), 23259671231196943.

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## Performance of Upper Limb Tool (PUL)

- Developed for patients with Duchenne Muscular Dystrophy; broader applications emerging.
- Clinician assessed performance scale.
  - 0 (unable), 1 (independently with modifications), and 2 (completed without compensation).

### Shoulder

- Shoulder flexion with weight

### Elbow

- Hand to mouth
- Lift heavy can diagonally

### Wrist and Fingers

- Tear paper
- Trace path
- Pick up coins

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## PUL Research

Cohort	Psychometrics
Neuromuscular Dystrophies	Functional evolution over time. MCID at least 4 point change between subsequent evaluations.
Limb-girdle Muscular Dystrophy	Identifies preserved function in presence of strength deficits.

Gandolla, M., et al. (2020). Test-retest reliability of the Performance of Upper Limb (PUL) module for muscular dystrophy patients. *PLoS One*, 15(9), e0239064.  
Diehl, E., et al. (2022). The Performance of Upper Limb (PUL) module in limb-girdle muscular dystrophy. *Acta Myologica*, 41(4), 207.

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## RETURN TO SPORT PERFORMANCE TESTING

- Single Arm Seated Shot Put Test (SSPT)
- Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST)

Incorporate subjective and objective measures.

Barber, P., et al. (2023). Objective and subjective measures to guide upper extremity return to sport testing: A modified Delphi survey. *Physical Therapy in Sport*.

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## Single Arm Seated Shot Put Test (SSPT)

- Long sitting across two armless chairs or on floor with back against wall.
- Hold weighted ball in one hand at shoulder height with elbow flexion and wrist extension.
- Push ball up and forward away from the body as far as possible.
- Measure distance thrown to where ball first touches ground.
- Average three trials.

DeGout, M., et al. (2021). Intra- and inter-session reliability and agreement of the unilateral seated shot-put test outcome measures in healthy male athletes. *BMC Sports Science, Medicine and Rehabilitation*, 13, 1-7.

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## Single Arm SSPT Research

Cohort	Psychometrics
Healthy Overhead Sport Athletes	Floor position Excellent reliability SEM 8 – 11 cm  Chair position Moderate to excellent reliability SEM 15 – 19 cm

Tagliarini, G. O., et al. (2023). Performance, Test-retest Reliability, and Measurement Error of the Upper Limb Seated Shot Put Test According to Different Positions of Execution. *International Journal of Sports Physical Therapy*, 18(3), 698.

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## Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST)

- Only assesses bilateral performance.
- Standard or modified push-up position on floor.
- Hands separated on tape marks.
- Alternate touching of opposite hand.
- Count number of cross-body touches.
- Average 3 trials of 15 seconds.

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## CKCUET Research

Cohort	Psychometrics
Healthy Males	Strong correlation to serratus anterior strength.
Female Athletes	MDC 4 SEM 7
Team Handball Players	Gender differences in performance. Does not differentiate presence of pain with activity.

Weon, Y.S., et al. (2021). Relationship between the Closed Kinetic Chain Upper Extremity Stability Test and strength of serratus anterior and triceps brachii muscles. *Physical Therapy Korea*, 28(3), 208-214.  
Kardos, S., et al. (2023). Upper extremity physical performance tests in female overhead athletes: a test-retest reliability study. *Journal of Orthopaedic Surgery and Research*, 18(1), 489.  
Torabi, T.P., et al. (2024). The Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST) Performance in Elite Team Handball Players Playing with Shoulder Pain, Previous Pain, or No Pain. *International journal of sports physical therapy*, 19(2), 189.

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## Conclusion

- A wide variety of performance and patient reported measures are available to support collaboration with the patient to identify and monitor progress toward meaningful goals.

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1. Which administration method of patient reported outcome measures tailors questions to best assess the individual?

- A. Short form paper based
- B. Interview method
- C. Caregiver proxy completion
- D. Computer adaptive testing

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2. The Minimal Clinically Important Difference (MCID) of an outcome measure is an example of what psychometric property?

- A. Responsiveness
- B. Reliability
- C. Construct validity
- D. Structural validity

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3. What tool provides standards for assessing methodological quality of studies examining health-related outcome measures?

- A. PROMIS
- B. COSMIN
- C. CPG
- D. De Novo

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4. Which of the following is NOT an activity assessed with the Modified American Shoulder and Elbow Surgeons (mASES) Society Standardized Shoulder Assessment?

- A. Open a jar of food
- B. Use a phone
- C. Carry shopping bag
- D. Throw ball overhead

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5. The Fugl-Meyer Upper Extremity Assessment is specific for individuals with what condition?

- A. Rotator Cuff Pathology
- B. Spinal Cord Injury
- C. Post-Stroke
- D. Hand Trauma

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6. The \_\_\_\_\_ defines occupational performance as an activity the client "wants to do, needs to do, or is expected to do".

- A. ODI
- B. COPM
- C. SPADI
- D. PROMIS

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7. The Simple Shoulder Test (SST) questionnaire utilizes what type of scale?

- A. Likert
- B. Dichotomous
- C. Multiple Rating
- D. Graphic

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8. What type of outcome measures should be utilized with the pediatric population?

- A. Primarily performance and clinical measures
- B. Only objective clinical assessments
- C. Patient reported measures completed by the parent
- D. Combination of performance, clinical, and patient reported

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9. In what direction should the weighted ball be thrown when performing the single arm seated shot-put test?

- A. Directly overhead
- B. Toward the arm that is not being tested
- C. Up and forward away from the body
- D. Ipsilaterally away from the body

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10. What is a limitation of the Closed Kinetic Chain Upper Extremity Stability Test?

- A. Inability to assess unilateral performance
- B. Need for isokinetic equipment
- C. Lower extremity support position cannot be modified
- D. Difficulty quantifying performance

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## Upper Extremity Outcome Measures

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