

# The Capabilities of Upper Extremity Test (CUE-T): results of a pilot study

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## Objective:

To describe the internal consistency and validity of a new test of upper limb functional limitations (FL) designed for persons with tetraplegia.

## Introduction:

Current clinical trials for neurorecovery in SCI must demonstrate clinically meaningful improvement in order to be deemed effective. Outcome tools need to be able to distinguish restoration of lost neurological function from improved activity completion due to adaptive strategies and equipment. The FL domain encompasses actions which are performed without equipment or assistance. (1) This distinguishes the domain from "Activities", where task completion may be accomplished with help and/or equipment. (2)

Previously we developed a questionnaire of upper limb actions (FL), the CUE-Q(3), which was shown to have good reliability and responsiveness. In this presentation we report initial assessment of an objective test of upper limb FL based on the CUE-Q. The CUE-T contains 36 items: 17 right, 17 left, and 2 bimanual. For details on development see **poster #80**.

## Methods

Thirty adults with chronic SCI, levels C4-T6, AIS A-D were evaluated once. Assessments included upper extremity manual muscle testing using the ASIA muscles and those required for the International Classification for Surgery of the Hand in Tetraplegia (ICSHT), the CUE-Q, and then the CUE-T.

## Data Analysis

Item scores were reviewed and cut points determined to items with repetition or time scores to a 0-4 scale, corresponding to CUE-Q scoring (**Fig 1**). To test construct validity, Spearman correlations were examined for CUE-T scores with upper extremity motor scores (UEMS), and with right and left UEMS and ICSHT classification. For internal consistency Cronbach's alpha was determined on total score and subscales.

**Table 1: Subject Characteristics**

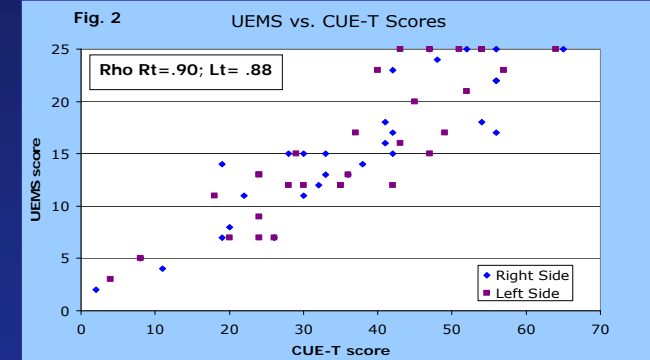
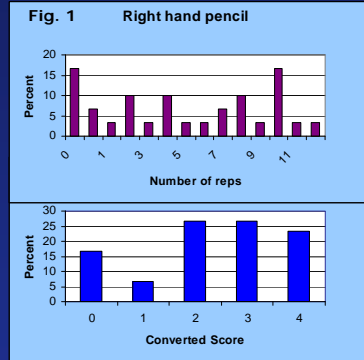
Motor	Motor Levels		
	C4-C6	C7-T1	T2-T6
Complete	9	7	4
Incomplete	6	4	0

**Table 2: Spearman Correlations**

	CUE-TEST		
	Total	Right	Left
UEMS	.90	0.90	0.88
ICSHT Class.	---	0.92	0.89

**Table 3: Cronbach's alpha**

Total	Right	Left
.96	0.94	0.93
Hand	0.94	0.94



## Results:

- Subject recruitment was targeted to reflect the range of impairment seen in tetraplegia. Neurological characteristics are found in **table 1**.
- The test was completed in under an hour in most cases.
- Spearman correlations with UEMS and ICSHT were excellent (**table 2 and fig 2**).
- Cronbach's alpha for the converted scale and subscale scores were  $\geq 0.90$  (**Table 3**).

## Conclusion:

The CUE-T is a comprehensive assessment of upper extremity actions (functional limitations) for SCI that can be completed in under an hour. It shows excellent internal and construct validity in preliminary testing. Reliability and responsiveness testing is underway.

## References:

- Marino RJ, Shea JA, Stineman MG. The Capabilities of Upper Extremity instrument: reliability and validity of a measure of functional limitation in tetraplegia. *Arch Phys Med Rehabil* 1998 December;79(12):1512-21.
- Nagi SZ. Disability concepts revisited: implications for prevention. In: Pope AM, Tarlov AR, editors. *Disability in America: Toward a national agenda for prevention*. Washington, D.C.: National Academy Press; 1991. p. 309-27.
- World Health Organization. *International Classification of Functioning, Disability and Health: ICF*. Geneva: World Health Organization; 2001. p. 14-17.