Ashworth and Modified Ashworth Scale (MAS)

Assessment Overview

Assessment Area

ICF Domain:
Body Function
Subcategory:
Neuromusculoskeletal & Movement-related Functions and Structures

You Will Need

Length:
5 minutes or less (depending on muscles/joints tested)
Training:
Requires clinical judgment and experience with spasticity
Scoring:
Original Ashworth Scale: Tests resistance to passive movement about a joint, scores range from 0-4 with 5 choices, a score of 1 indicates no resistance, 5 indicates rigidity.
Modified Ashworth Scale: Similar to the Ashworth Scale but adds a 1+ scoring category to indicate resistance through less than half of the movement, scores range from 0 (no increase in muscle tone) to 4 (affected part(s) rigid in flexion or extension, with 6 choices.

Summary

The Ashworth Scale measures the effects of antispasticity drugs in individuals with multiple sclerosis (it has subsequently been adapted for other diagnoses, including SCI).

The Modified Ashworth Scale measures resistance during passive soft-tissue stretching and is used as a simple measure of spasticity in patients with lesions of the Central Nervous System

Availability

Available for free here at "Ashworth and Modified Ashworth Scale (MAS)" page.
Video: https://www.youtube.com/watch?v=d2olAzpL_lc

Assessment Interpretability

Minimal Clinically Important Difference

Not established for SCI;

In stroke, initial change in muscle tone/spasticity in response to Botox® treatment was approximately a 1-point decrease on the MAS scale, reflecting a clinically significant improvement

(Shaw et al. 2010, n=333, adults with upper limb spasticity due to stroke; >1 month post-stroke)

Statistical Error

Not established for SCI

Typical Values

Score Distributions (SD):
　Score 0: 25.7%
　Score 1: 34.0%
　Score 2: 23.7%
　Score 3: 16.5%

(Sherwood et al., 2000; N=97, 95 male, 62 cervical SCI; mixed injury types; 0.5-39 years post-SCI)

Measurement Properties

Validity – *Low* to **High**

Moderate to ***High*** **correlation with Spinal Cord Assessment Tool for Spastic reflexes (SCATS):**

		Ashworth		
		Hip	Knee	Ankle
SCATS	Clonus	0.56	0.65	0.60
	Flexion	0.55	0.47	0.40
	Extension	0.98	0.88	0.61

Moderate **correlation with Penn Spasm Frequency Scale (PSFS):**
Ashworth Hip: r = 0.43
Ashworth Knee: r = 0.43
Ashworth Ankle: r = 0.51

(Benz et al. 2005; n=17; mixed injury types; 24-372 months post-SCI)

Low **correlation with Spasm Frequency Scale (SFS):**
ρ: -0.13 to 0.21

(Baunsgaard et al. 2016; n=31; 20 males; mean age: 48.3 ± 20.2 years, age range: 15-88 years, 17 traumatic, 14 non-traumatic)

Moderate to ***High*** **correlation with Modified Tardieu Scale (MTS):**

r= 0.791 (Hip adductor muscles)
r=0.920 (hip extensor muscles)
r=0.539 (knee extensor muscles)
r=0.562 (knee flexor muscles)
r=0.864 (ankle plantar flexor muscles)

(Akpinar et al. 2017; n=58; 37 males; mean age: 44±14 years, age range: 18-88 years, mixed injury)

Number of studies reporting validity data: 8

Reliability – *Moderate* to **High**

Moderate **Inter-rater Reliability (for MAS):**
ICC = 0.56

(Tederko et al 2007; n=30, 23 males; mixed injury type cervical SCI; inpatient; mean time since injury = 14.1 months)

Moderate to **High** **inter-rater reliability (MAS):**
Kappa: 0.531-0.774

Moderate **test-retest reliability (MAS):**
Kappa: 0.580-0.716

(Akpinar et al. 2017; n=58; 37 males; mean age: 44±14 years, age range: 18-88 years, mixed injury)

Number of studies reporting reliability data: 8

Responsiveness

Floor/Ceiling Effect:
In a group of MS or SCI patients: with intrathecal baclofen treatment, Ashworth scores were found to significantly decrease

(Boviatsis et al. 2005; n=22, 15 with MS, 7 with SCI; no SCI type data available; 12 males; mean time since injury = 2.71 years)

Effect Size:
Not established for SCI

Number of studies reporting responsiveness data: 4