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 0 indicates no resistance, 4 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 Modified Ashworth Scale (MAS) is a revised version of the original Ashworth Scale which measures resistance during passive soft-tissue stretching. The MAS is used as a simple measure of spasticity in patients with lesions of the Central Nervous System.

The Ashworth Scale and the Modified Ashworth Scale are administered by a clinician with experience with spasticity.

Availability

Worksheet: Can be found here.

Video: https://www.youtube.com/watch?v=d2olAzpL_Ic

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 males; mean age: 45 years; 62 cervical SCI, 35 thoracic SCI; 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; ASIA A-C; 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; 18 ASIA A/B/C, 13 ASIA D)

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; 13 ASIA A, 8 ASIA B, 16 ASIA C, 21 ASIA D)

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; mean age: 33.9 years; cervical SCI, 16 tetraplegia, 14 tetraparesis; 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; 13 ASIA A, 8 ASIA B, 16 ASIA C, 21 ASIA D)

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; 12 males; mean time since injury: 2.71 years)

Effect Size:
Not established for SCI

Number of studies reporting responsiveness data: 4