Ashworth and Modified Ashworth Scale (MAS)

Assessment Overview

Assessment Area

<table>
<thead>
<tr>
<th>ICF Domain:</th>
<th>Body Function</th>
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<tr>
<td>Subcategory:</td>
<td>Neuromusculoskeletal &amp; Movement-related Functions and Structures</td>
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Summary

The Ashworth Scale is a measure of spasticity originally developed to assess the anti-spastic effects of carisoprodol in multiple sclerosis (it has subsequently been adapted for a variety of other diagnoses, including SCI).

It consists of a 5-point nominal scale using subjective clinical assessments of tone ranging from 0 – ‘No increases in tone’ to 4 – ‘Limb rigid in flexion or extension [abduction/adduction]’. An additional grade is added (1+) for the MAS to indicate resistance in the movement. This enhances sensitivity and accommodates hemi-paretic patients who typically graded at the lower end of the scale.

You Will Need

<table>
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<tr>
<th>Length:</th>
<th>5 minutes or less (depending on muscles/joints tested)</th>
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<tr>
<td>Training:</td>
<td>None, but requires clinical judgment and experience with spasticity</td>
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<tr>
<td>Scoring:</td>
<td>5-point nominal scale using subjective clinical assessments of tone</td>
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<td>Additional 1+ grade for resistance in MAS</td>
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Availability

http://www.scireproject.com/sites/default/files/worksheet_ashworth.docx

Video: https://www.scireproject.com/outcome-measures/video

Assessment Interpretability

Minimal Clinically Important Difference

Not established for SCI; but 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 – Moderate to High

Moderate to High correlation with Spinal Cord Assessment Tool for Spastic reflexes (SCATS):
- Ashworth
  - Hip: 0.56
  - Knee: 0.65
  - Ankle: 0.60
- Clonus
  - 0.56

SCATS
- Flexion: 0.55
- Extension: 0.98

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

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

Number of studies reporting validity data: 6

Reliability – Moderate

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)

Number of studies reporting reliability data: 6

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