Manual Muscle Testing (MMT)

Assessment Overview

Assessment Area

ICF Domain:
Body Functions
Subcategory:
Neuromusculoskeletal Functions

You Will Need

Length:
Depends on muscles tested; < 1 minute for each muscle
Scoring:
Each muscle rated 0-5, higher score indicated greater strength
Training:
No formal training required, but should be administered by professionals

Summary

Manual Muscle Testing (MMT) is a clinician-administered measure of muscle strength. Each muscle or muscle group is individually tested, and rated in terms of strength against gravity and/or resistance. The MMT does not require any specialized equipment.

Three different versions of grading scales for the MMT have been developed to date, each of which can be found below, in the Availability section.

The MMT has since been adapted for use as the ASIA Motor Score, and for muscle strength testing in the Graded Redefined Assessment of Strength, Sensibility, and Prehension (GRASSP).

Availability

Refer to:

1. Daniels and Worthingham's Muscle Testing protocol
2. Muscles Testing and Function (Kendall & McCreary)
3. Aids to the examination of the peripheral nervous system (Medical Research Council)

Assessment Interpretability

Minimal Clinically Important Difference

Not established in SCI

Statistical Error

Not established in SCI

Typical Values

Not established in SCI

Measurement Properties

Validity – Moderate to High

High correlation with Spinal Cord Independence Measure (SCIM III):

Sum of MMT scores from multiple upper-limb muscles with:

SCIM Self-care items: r = 0.70-0.89

SCIM Self-care total: r = 0.84

SCIM Respiration & Sphincter: r = 0.68

SCIM Mobility: r = 0.71

SCIM Total: r = 0.78

Single upper-limb muscle MMT scores with SCIM Self-care total:

r = 0.36-0.82

(Rudhe et al. 2009; N=29; 16 males; ASIA A-D; mean (SD) time since injury: 4.5 (3) months)

Moderate to High correlation with Walking Index for SCI (WISCI):

WISCI Level: r = 0.647-0.663

WISCI Speed: r = 0.494-0.539

(Burns et al. 2011; n=75; 79% males; tetraplegia and paraplegia; patients able to ambulate ⩾10m, 88% AIS-D)

Number of studies reporting validity data: 6

Reliability

Inter-rater Reliability:

Agreement = 82%-84%

(Savic et al. 2007; n=45; 38 males, 7 females; 24 AIS-A, 13 AIS-D, 29 thoracic)

Agreement of wrist extensors and elbow flexors:

0.96, 094

(Bye et al. 2021; n=60; 48 males, 12 females; mean age: 55 years; ASIA: 17A, 14B, 13C, 16D; median (IQR) time since injury: 4 (1.5 to 24) months)

Number of studies reporting reliability data: 3

Responsiveness

Floor/Ceiling Effect:
Not established in SCI

Effect Size:
Not established in SCI

Number of studies reporting responsiveness data: 0