Hand-Held Myometer

Assessment Overview

Assessment Area

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

You Will Need

Length:
30 minutes
Equipment:
A myometer
Scoring:
The recommended unit of measurement is kg in order avoid interpretation issues. Measurements are generally rounded to the nearest kg.
Training:
No formal training required, but examiners should be familiar with the techniques, appropriate body positioning for patient and tester, and proper administration.

Summary

The Hand-Held Myometer is a portable device used as a quantitative method of measuring muscle contraction (primarily for upper limb).

Testing is performed using one of two techniques, 1) make or 2) break.

- The 'make' technique requires the examiner to resist a maximal voluntary contraction by the patient, thereby producing an isometric contraction.
- In the 'break' technique, the examiner applies adequate force to overcome the patient, thereby producing an eccentric contraction.

Availability

Worksheet: Can be found here.

Assessment Interpretability

Minimal Clinically Important Difference

Not established in SCI

Statistical Error

Standard Error of Measurement (lbs) – Tester 1, Tester 2:
Left biceps = 5.05, 1.84
Right biceps = 2.94, 2.96
Left triceps = 2.91, 2.17
Right triceps = 3.26, 2.44
Left wrist extensors = 2.71, 1.73
Right wrist extensors= 2.94, 0.26
Minimal Detectable Change (lbs) – Tester 1, Tester 2:
Left biceps = 14.01, 5.10
Right biceps = 8.15, 8.21
Left triceps = 8.08, 6.01
Right triceps = 9.04, 6.76
Left wrist extensors = 7.51, 4.80
Right wrist extensors= 8.14, 0.73

Typical Values

Mean (SD) Scores (lbs) – Tester 1, Tester 2:
Left biceps = 46.79 (11.91), 37.92 (8.23)
Right biceps = 46.20 (14.70), 34.97 (9.37)
Left triceps = 26.28 (11.90), 26.33 (12.51)
Right triceps = 30.74 (9.41, 27.21 (14.09)
Left wrist extensors = 23.80 (13.55), 23.26 (10.00)
Right wrist extensors= 31.39 (11.99), 23.05 (10.52)

(Aufsesser et al. 2003; n=25; mean (SD) age: 52 (16) years; 11 paraplegia, 14 tetraplegia; mean (SD) time since injury: 13 (10) years)

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Measurement Properties

Validity – Low to High

Low to High correlation with Manual Muscle Testing:
People with paraplegia = 0.26-0.67

(Noreau & Vachon 1998; n=38; 31 males, 7 females; tetraplegia and paraplegia; mean time since injury (SD) at admission: 1.6 (0.7) months, mean time since injury (SD) at discharge: 2.1 (2.1) months)

People with tetraplegia = 0.59-0.94

(Schwartz et al. 1992; n=122; 122 males; quadriplegia, over 6 time points b/w 72 hours and 12 months post-injury)

Moderate to High correlation with Isokinetic Dynamometry:
People with paraplegia = 0.70-0.90
People with tetraplegia = 0.57-0.96

(Noreau & Vachon 1998; n=38; 31 males, 7 females; tetraplegia and paraplegia; mean time since injury (SD) at admission: 1.6 (0.7) months, mean time since injury (SD) at discharge: 2.1 (2.1) months)

Number of studies reporting validity data: 5

Reliability – High

High Inter-rater Reliability:
Make Technique: ICC = 0.94-0.97
Break Technique: ICC = 0.94-0.95

High Intra-rater Reliability:
Make Technique: ICC = 0.91-0.94
Break Technique: ICC = 0.93-0.94

(Burns et al. 2005; n=19; 19 males; 6 ASIA A, 3 ASIA B, 10 ASIA D; inpatient, 3 < 6 months post-injury, 16 >1 year post-injury, 2 testers)

Number of studies reporting reliability data: 7

Responsiveness

Floor/Ceiling Effect:
Not established in SCI

Effect Size:
Not established in SCI

Number of studies reporting responsiveness data: 0