

Wartenberg Pendulum Test

Assessment Overview

Assessment Area

ICF Domain:

Body Function

Subcategory:

Neuromusculoskeletal &
Movement-related Functions and
Structures

You Will Need

Length:

1 test, recommended to be
repeated up to 4 times at 1-
minute intervals

Less than 5 min per test

Equipment:

Typically, either electro-
goniometers, uni-planar video or
3D motion analysis systems

Training:

Knowledge of spasticity is
recommended

Summary

The Wartenberg Pendulum Test was introduced in the 1950s as a diagnostic tool of spasticity. It was originally a qualitative measure (clinician simply observed the leg swing).

The use of electronic equipment to generate quantitative data was introduced in the 1980's.

This test has not been validated in a SCI specific population and its validity in other populations is debated.

Availability

Worksheet: Can be found [here](#).

Video: <https://www.youtube.com/watch?v=yYtGjvCcA7o>

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 – **Low** to **High**

Low to High correlation between pendulum test score and average velocity for three therapists:

Therapist A: $r = 0.223$

Therapist B: $r = 0.657$

Therapist C: $r = 0.67$

(Smith et al. 2000; n=22, 21 males, 1 female; tetraplegia and paraplegia; mean (SD) time since injury: 29.8 (43.2) months)

Number of studies reporting validity data: 1

Reliability – **High**

High Inter-trial Reliability between seven pendulum tests:

ICC = 0.92

(Smith et al. 2000; n=22, 21 males, 1 female; tetraplegia and paraplegia; mean (SD) time since injury: 29.8 (43.2) months)

High Test-retest reliability:

Optical Tracking System with Pendulum test (OTS): ICC = 0.932 (95% CI)

Inertial Measurement Units with Pendulum Test (IMU): ICC = 0.925 (95% CI)

(De Santis & Perez 2024; n=23; various level of injury; AIS: 5A, 2B, 6C, 10D)

Number of studies reporting reliability data: 2

Responsiveness

Floor/Ceiling Effect:

Not established in SCI

Effect Size:

Not established in SCI

Number of studies reporting

responsiveness data: 0