

10 Meter Walking Test (10 MWT)

Assessment Overview

Assessment Area

ICF Domain:

Activity

Subcategory:

Mobility

You Will Need

Length:

Less than 5 minutes

Equipment:

14m corridor

Stopwatch

Scoring:

The time (to the nearest second) is reported.

Walking speed (m/s) can be calculated by dividing 10 meters by time in seconds.

Summary

The 10 Meter Walking Test (10 MWT) assesses short duration walking speed (m/s). It has been used in various patient populations including stroke, Parkinson's disease, general neurologic movement disorders and SCI.

The 10 Meter Walking Test (10 MWT) is clinician-administered, and measures the time required to walk 10 meters. The test is performed using a "flying start": the patient walks 14 meters and the time is measured for the middle 10 meters.

The individual performing the test:

- Walks at his/her preferred walking speed,
- May use their usual assistive devices (e.g., braces, walker), and
- Must wear shoes.

Availability

Worksheet: N/A. Stopwatch only required.

Video: <https://scireproject.com/videos-and-toolkits/videos/>

Assessment Interpretability

Minimal Clinically Important Difference

0.15 m/s

(Forrest et al. 2014; n=249; 190 males, 59 females; mean (SD) age: 42 (16) years; 20 ASIA C, 179 ASIA D; and median time since injury: 0.7 years)

Statistical Error

Standard Error of Measurement:

0.05 m/s

(Lam et al. 2008, calculated from measurements made in van Hedel et al. 2005; n=22, 14 males, AIS A-D; paraplegia, no information on chronicity)

Minimal Detectable Change:

0.105 m/s

(Tester et al. 2016; n=72, 57 males, 15 females; 17 ASIA A, 10 ASIA B, 20 ASIA C, and 25 ASIA D; 44 cervical, 28 thoracic; and median (range) time since SCI: 0.7 (0.1-14.7) years)

Typical Values

Median (range) Scores:

All individuals: 0(0-2.0)-0(0-2.6)

AIS-A/B: All non-ambulatory

AIS-C: 0(0-0.5)-0(0-1.7)

AIS-D: 0.3(0-2.0)-0.8(0-2.6)

(Post locomotor training: Harkema et al. 2016; n=156; 123 males, 29 females; mean (SD) age: 36 (15) years; 110 cervical, 42 thoracic; 43 ASIA A, 21 ASIA B, 39 ASIA C, and 49 ASIA D; and median (range) time since injury: 0.9 (0.1-45.2) years)

Threshold Values for "functional walking": Mean (SD) minimal required speed: 0.70 ± 0.13 m/s

(van Hedel et al. 2009; n=886; 412 ASIA A, 113 ASIA B, 137 ASIA C, and 223 ASIA D; and level of injury: 28% paraplegia)

Measurement Properties

Validity – **Low** to **High**

High correlation with Walking Index for SCI:

At 3 months $r = 0.78$
At 6 months $r = 0.85$
At 12 months $r = 0.77$

High correlation with Functional Independence Measure-Locomotor Score:

At 3 months $r = 0.80$
At 6 months $r > 0.80$
At 12 months $r = 0.66$

High correlation with 6-Minute Walk Test:

At 3 months $r = 0.95$
At 6 months $r > 0.80$
At 12 months $r = 0.92$

(Ditunno et al. 2007; $n=146$; 114 males, 32 females; mean age: 32 years; incomplete SCI; and inpatient)

Moderate correlation with ASIA Motor Scale:

LEMS $r = 0.69$
ASIA Motor Score $r = 0.63$

(Harkema et al. 2016; $n=156$; 123 males, 29 females; mean (SD) age: 36 (15) years; 110 cervical, 42 thoracic; 43 ASIA A, 21 ASIA B, 39 ASIA C, and 49 ASIA D; and median (range) time since injury: 0.9 (0.1-45.2) years)

High Correlation with 2-Minute Walk Test:

$r=0.964$ (Self 10MWT), $r=0.974$ (Maximal 10MWT)

(Willi et al. 2023; $n=50$; mean (SD) age: 52.6 (16.2) years; 24 tetraplegic, 26 paraplegic; 2 ASIA A, 7 ASIA C, and 41 ASIA D; and mean (SD) time since injury: 6.11 (9.8) years)

Low Correlation with Standing and Walking Assessment Tool:

$r=0.415$ (preferred speed), $r=0.409$ (fast speed)

(Musselman et al. 2022; $N= 618$; 141 females; mean age: 48.7 years; 164 ASIA A, 66 ASIA B, 104 ASIA C, 283 ASIA D, 1 ASIA E; 383 cervical, 156 thoracic, 72 lumbar, 7 sacral)

High correlation with Mini BESTest:

Correlation $\rho = -0.81$; ($p < 0.001$)

High correlation with Berg Balance Scale:

Correlation $\rho = -0.88$; ($p < 0.001$)

(Jorgensen et al. 2017; $n=46$; 32 males, 14 females; mean (SD) age: 54.5 (17.0) years; 7 ASIA A, B, or C, 39 ASIA D; and median time since injury: 6.5 years)

Number of studies reporting validity data: 21

Reliability – **High**

High Test-retest Reliability:

ICC = 0.977-0.981

(Musselman and Yang 2013; $n=20$; 14 males, 6 females; incomplete SCI; and mean (SD) time since injury: 5.4 (8.8) years)

High Inter-rater Reliability:

ICC = 0.997

(Srisim et al. 2015; $n=83$; AIS C-D; tetraplegia and paraplegia; and mean time since injury (multiple and non-multiple fallers): 46.72-58.70 months)

High Intra-rater Reliability:

ICC = 0.974

(Van Hedel et al. 2005; $n=22$, 14 males; AIS A-D; paraplegia; and no information on chronicity)

High Test-retest Reliability:

ICC = 0.983-0.97

(Perez-Sanpablo et al. 2017; $n=23$; 15 males; mean (SD) age: 45.6 (12.6) years; and chronic and subacute injury types).

High Test-retest Reliability:

ICC = 0.99

(Rini et al. 2018; $n=25$; 22 males, 3 females; mean age: 27 years; AIS A/B; and mean time since injury: 5.5 years)

Number of studies reporting reliability data: 8

Responsiveness

Floor/Ceiling Effect:

Not established in SCI

Effect Size:

Mean change (m/s):

1 to 3 months post-injury = 0.92

3 to 6 months post-injury = 0.47

(Lam et al. 2008, calculated from measurements made in van Hedel et al. 2007; n=51, 42 males, incomplete SCI, 46 with traumatic injury)

Number of studies

reporting responsiveness

data: 3

Standardized Response Mean:

All individuals: 0.51

AIS-A/B: 0.51

AIS-C: 0.50

AIS-D: 0.98

(Post locomotor training: Harkema et al. 2016; n=156; 123 males, 29 females; mean (SD) age: 36 (15) years; 110 cervical, 42 thoracic; 43 ASIA A, 21 ASIA B, 39 ASIA C, and 49 ASIA D; and median (range) time since injury: 0.9 (0.1-45.2) years)