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

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:

Not established in SCI

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 > 0.80
At 12 months r = 0.66

High correlation with 6-Minute Walk Test:

At 3 months r = 0.95
At 6 months > 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)

Low to Moderate correlation with ASIA Motor Scale:

UEMS r = 0.24
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)

Moderate to High correlation with WISCI-II:

r=-0.37 to -0.795

Moderate correlation with LEMS:

r= -0.4 to -0.39

(Perez-Sanpablo et al. 2017; n=23, 15 males, 8 females; mean (SD) age: 45.6 (12.6) years, ASIA D; and chronic and subacute injury types)

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)

High Correlation with SCI Gait Deviation Index:

r= -0.711 (Self 10MWT), r= -0.716 (Maximal 10MWT)

(Sinovas-Alonso et al. 2023; n=35; 24 males, 11 females; mean (SD) age: 35.5 (17.2) years; and incomplete SCI. n=50 non-SCI)

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)

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

High Correlation with Functional Gait Assessment:

Correlation: ρ=0.90 (p=0.00)

(Kahn et al. 2020; n=12; 11 males, 1 female; mean (SD) age: 55.41 (11.65); 7 cervical, 5 thoracic; 2 ASIA C, 10 ASIA D; mean (SD) time since injury: 7.8 (7.8) years)

High correlation with Mini BESTest:

Correlation ρ= -0.81; p<0.001

High correlation with Berg Balance Scale:

Correlation= ρ= -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)

High correlation with Activity Balance Confidence Scale:

r=0.80 (fast 10MWT), r=0.76 (self-selected 10MWT)

(Shah et al. 2017; n=26; 20 males,6 females; mean (SD) age: 59.7 (18.9); 5 ASIA C, 21 ASIA D; and chronic)

Number of studies reporting validity data: 21

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)

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)

Number of studies reporting responsiveness data: 3