Berg Balance Scale (BBS)

Assessment Overview

Assessment Area

ICF Domain:
Activity
Subcategory:
Mobility

You Will Need

Length:
Approximately 20 minutes
Equipment:
- 2 standard chairs (1 with arms and 1 without)
- Stopwatch
- Step or stepstool
- Ruler

Scoring:
Each of the 14 tasks is rated on a 5-point scale from 0 (cannot perform) to 4 (normal performance). Task scores are summed to yield a total score (0-56).

Summary

The Berg Balance Scale (BBS) is a performance-based measure of balance with a number of clinical walking evaluations. Tasks progress in difficulty and include functional activities related to balance while reaching, bending, transferring, and standing.

The BBS has been found to be an appropriate assessment of standing balance as shown by its strong associations with various clinical walking evaluations. The tool is applicable to people with incomplete SCI.

Availability

Worksheet: Can be found here.

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

Languages: English, Italian, Turkish, Brazilian-Portuguese, German, Korean, Spanish, and Dutch.

Assessment Interpretability

Minimal Clinically Important Difference

Not established in SCI

Statistical Error

Standard Error of Measurement:
0.66
(Srism et al. 2015; n=83, mean age 44.21 years; ASIA C; mean time since injury of multiple and non-multiple fallers: 58.7 and 46.7 months, respectively)

Minimal Detectable Change:
%MDC = 17.2%
MDC$_{95}$ = 5.74
(Lemay & Nadeau 2010; N=32, 25 male, AIS D mixed injury types, mean time since injury (SD) = 77.2 (44.3) days)

Typical Values

Mean (SD) Admission-Discharge Scores:
All individuals: 11(16)-17(20)
AIS-A/B: 3(2)-4(2)
AIS-C: 5(6)-13(15)
AIS-D: 26(19)-36(20)
(Post locomotor training; Harkema et al. 2016; n=152; 123 males, 29 females; level of injury: 110 cervical, 42 thoracic; ASIA A-D; median (range) time post-SCI: 0.9 (0.1-45.2) years)

Threshold Values:
No effective threshold for distinguishing fallers from non-fallers
(Wirz et al 2010; n=42; 33 males, 9 females; ASIA A-D (35 ASIA C); mean (SD) 66.5 (66.2) months post-SCI)

Measurement Properties

Validity – Low to High

High correlation with Walking Index for SCI:

r = 0.89-0.92

High correlation with Functional Independence Measure (FIM):

r = 0.72-0.77

High correlation with FIM Locomotor Score:

r = 0.86-0.89

(Ditunno et al. 2007; n=146; 114 males; inpatient; incomplete SCI; within 1 year post-injury)

Low to High correlation with ASIA Motor Scale:

UEMS = 0.30

LEMS = 0.79

ASIA Motor Score = 0.75

(Harkema et al. 2016; n=152; 123 males, 29 females; level of injury: 110 cervical, 42 thoracic; ASIA A-D; median (range) time post-SCI: 0.9 (0.1-45.2) years)

High correlation with Mini-BESTest scale:

r = 0.90 (P<0.001)

High correlation with Timed Up and Go (TUG) assessment:

r = -0.75 (P<0.001)

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

r = 0.88 (P<0.001)

High correlation with Walking Index for Spinal Cord Injury version II (WISCI):

r = 0.63 (P<0.001)

Reliability – High

High Inter-rater Reliability:

ICC = 0.998

(Srism et al. 2015; n=83, mean age 44.21 years; ASIA C; mean time since injury of multiple and non-multiple fallers: 58.7 and 46.7 months, respectively)

High Intra-rater Reliability:

ICC = 0.97

(Tamburella et al. 2014; n=23; 14 males, 9 females; mean age 48.3 years; AIS D; time Since Injury (SD): 16.43 (19.03) months)

High Internal Consistency:

α = 0.94

(Jørgensen et al. 2017; n=46; 32 males, 14 females; ASIA A-D (AIS D = 85%); duration of injury (range): 6.5 years (1-41))

Number of studies reporting reliability data: 5

High correlation with Fall Efficiency Scale – International (FES-I):

r = -0.68 (P<0.001)

Low correlation with participants' fear of falling:

r = -0.32 (P=0.83)

Low correlation with Quality of Life (QOL) questionnaire:

r = -0.75 (P=0.20)

(Jørgensen et al. 2017; n=46; 32 males, 14 females; ASIA A-D (AIS D = 85%); duration of injury (range): 6.5 years (1-41))

Number of studies reporting validity data: 8

Responsiveness

Floor/Ceiling Effect:

Substantial ceiling effect; 28.3%-37.5% of subjects reached maximal score

(Lemay & Nadeau 2010; n=32; 25 males, 7 females; injury level: 15 paraplegia, 17 tetraplegia; AIS D; mean time since injury (SD): 77.2 (44.3) days)

(Jørgensen et al. 2017; n=46; 32 males, 14 females; ASIA A-D (AIS D = 85%); duration of injury (range): 6.5 years (1-41))

(Morooka et al. 2024; n=20; 14 males, 6 females; mean age: 64.3 years; ASIA A; mean time since injury: 19.6 days)

Effect Size:

Standardized Response Mean:
All individuals: 0.59
AIS-A/B: 0.52
AIS-C: 0.65
AIS-D: 0.91

(Post locomotor training; Harkema et al. 2016; n=152; 123 males, 29 females; level of injury: 110 cervical, 42 thoracic; ASIA A-D; median (range) time post-SCI: 0.9 (0.1-45.2) years)

Number of studies reporting responsiveness data: 3