

Box and Block Test (BBT)

Assessment Overview

Assessment Area

ICF Domain:

Activity

Subcategory:

Mobility

You Will Need

Length:

5 minutes

Scoring:

Scored by counting the number of blocks carried over by the individual from one compartment to the other.

Equipment:

- Stopwatch
- Wooden box with partition (box: 53.7 x 25.4 x 8.5 cm, partition: 25.4 cm x 15.2 cm x 1 cm)
- 150 wooden blocks (2.5 cm cubed)

Summary

The Box and Block Test (BBT) is a measure of manual dexterity that requires repeatedly moving 1-inch blocks from one side of a box to another in 60 seconds.

It is commonly used in the stroke population to determine how well someone's hands work. It measures unilateral function, not bilateral function.

Availability

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

Video: [SCIREproject.com – Box and Block Test - Youtube](#)

Assessment Interpretability

Minimal Clinically Important Difference

Not established in SCI

Statistical Error

Not established in SCI.
For stroke patients:

Standard Error of Measurement:

More affected hand = 1.99

Less affected hand = 2.84

Minimal Detectable Change:

5.5 blocks per minute

Percentage change = 18%

(Chen et al. 2009, N=62 (45 males), Mean age (SD): 61.0 (9.9), 98% RH dominant, 50% right side hemiplegia, median months since stroke (range): 8 (3.0-21.8))

Typical Values

Normative Mean (SD) Values:

RH dom Male: 76.9 (11.6)

LH dom Male: 75.4 (11.4)

RH dominant Female: 78.4 (10.4)

LH dominant Female: 75.8 (9.5)

(Mathiowetz et al 1985; N=628 healthy participants, 310 male; age 20-75+)

Measurement Properties

Validity – **Low** to **High**

Low to Moderate correlation with SCIM-III:

SCIM-self-care: $r = 0.55$

SCIM-total: $r = 0.33$

SCIM-mobility: $r = 0.29$

SCIM-respiration/sphincter: $r = 0.12$

(Lili et al. 2023; $n = 25$; 18 males, 7 females; mean age: 58.4 years; injury level: 17 cervical, 8 thoracic; ASIA: 14 ASIA A-B, 11 ASIA C-D; mean time since injury: 17.5 years)

For stroke patients:

Low to High correlation with:

Fugl-Meyer motor – $r = 0.921$

Fugl-Meyer sensation – $r = 0.285$

Fugl-Meyer joint motion/pain – $r = 0.433$

Action Research Arm Test – $r = 0.951$

Motricity Index – $r = 0.798$

Ashworth Scale – $r = -0.383$

Hemispheric Stroke Scale – $r = -0.676$

Modified Barthel Index – $r = 0.044$

(Platz et al. 2005; $n = 56$, 37 stroke, 14 MS, 5 TBI; 31 male)

Number of studies reporting validity data: 2

Reliability – **High**

Not established in SCI.

For stroke patients:

High Test-retest Reliability:

ICC = 0.93-0.98

High Inter-rater Reliability:

ICC = 0.993-1.000

(Platz et al. 2005; $n = 56$, 37 stroke, 14 MS, 5 TBI; 31 male)

(Chen et al. 2009, $N=62$ (45 males), Mean age (SD): 61.0 (9.9), 98% RH dominant, 50% right side hemiplegia, median months since stroke (range): 8 (3.0-21.8))

(Mathiowetz et al 1985; $N=628$ healthy participants, 310 male; age 20-75+)

Number of studies reporting reliability data: 3

Responsiveness

Floor/Ceiling Effect:

Not established in SCI

Effect Size:

Not established in SCI

Number of studies reporting

responsiveness data: 0