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.

Detailed instructions are available from Mathiowetz et al. 1985a "Adult norms for the Box and Block test of manual dexterity"

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

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