Wheelchair Circuit (WC)

Assessment Overview

Assessment Area

**ICF Domain:**
Activity

**Subcategory:**
Mobility

You Will Need

Approximately 30-45 minutes to complete 9 tasks (with 2 minutes of rest between each task).

**Equipment:**
- An adjustable mat
- Wheelchair Treadmill (with 3% and 6% grade)
- Heart Rate monitor
- Stopwatch
- 0.10 m platform on floor
- Wood doorstep height 0.4 m
- Open space
- 15 m corridor

**Scoring:**
- Separate scores for ability (ordinal scale); performance time (seconds); and physical strain (formula using HR data) are calculated.

Summary

The Wheelchair Circuit (WC) is a performance-based measure that assesses manual wheelchair mobility (i.e., skill and performance).

Tasks cover 3 aspects of mobility:
1) Tempo (tasks = figure-of-8 shape and sprint)
2) Technical skill (tasks = crossing a doorstep, mounting a platform, and transferring)
3) Physical capacity (tasks = wheelchair propulsion and ascending slopes).

Availability

Download here:

Available in: English

Assessment Interpretability

Minimal Clinically Important Difference

Not established for SCI

Statistical Error

**Minimum Detectable Change**
Calculated from Kilkens et al., 2002 (N=27):

- **Performance Time score (seconds):**
  - Figure-8: 4.1
  - Crossing Doorstep: 6.1
  - Mounting Platform: 6.2
  - Sprint: 1.5
  - Transfer: 33.8

- **Peak Heart Rate score (beats/min):**
  - Figure-8: 18.9
  - Crossing Doorstep: 17.7
  - Mounting Platform: 21.3
  - Sprint: 20.9
  - Walking: 12.2
  - 3% Slope: 25.5

Typical Values

Not established in SCI
Measurement Properties

Validity – Moderate

Moderate correlation with Functional Independence Measure (FIM) – Mobility:

Spearman’s $\rho = 0.517$ (At admission), 0.519 (At discharge) (WC ability score)

Pearson’s $r = -0.466$ (At admission), -0.396 (At discharge) (WC Performance Time score)

(Kilkens et al., 2004; N=74, 51 male, majority paraplegic)

Number of studies reporting validity data: 1

Reliability – Moderate to High

High Inter-rater Reliability:

$ICC = 0.97$ (Task feasibility), 0.76-0.98 (Individual items), 0.82-0.99 (Peak heart rate)

Moderate to High Intra-rater Reliability:

$ICC = 0.98$ (Task feasibility), 0.71-0.99 (Performance Time score items), 0.68-0.96 (Physical Strain score items)

Test Retest Reliability

(Kilkens et al., 2002; N=27)

Number of studies reporting reliability data: 1

Responsiveness

Floor/Ceiling Effect:
Not established in SCI

Effect Size:
Standardized Response Mean (Between admission and discharge):

0.6 (WC Ability score)
0.9 (Performance Time score)
0.80 (Physical Strain score)

(Kilkens et al., 2004; N=74, 51 male, majority paraplegic)

Number of studies reporting responsiveness data: 1