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| Wheelchair Circuit (WC) |
| **Assessment Overview** |
| Assessment Area

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| **ICF Domain:**Activity**Subcategory:**Mobility |

 | Summary

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| The Wheelchair Circuit (WC) is a performance-based measure that assesses manual wheelchair mobility (i.e., skill and performance). The WC includes functional tasks developed specifically for people with SCI who use manual wheelchairs. Some tasks may be too difficult / not suitable if individuals have medical complications (cardiovascular and musculoskeletal diseases), or are older.Tasks cover 3 aspects of mobility: 1) Tempo (figure-of-8 shape and sprint) 2) Technical skill (crossing a doorstep, mounting a platform, and transferring) 3) Physical capacity (wheelchair propulsion and ascending slopes).The performance time and physical strain are useful to monitor progress once the individual achieves a maximal score on the ability score or if they have not demonstrated any change over repeated administrations. |

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| You Will Need

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| **Length:** Approx. 30-45 min, 8-9 tasks (2 min of rest between each task). **Equipment:**Adjustable matWheelchair Treadmill (with 3% and 6% grade)Heart Rate monitorStopwatch0.10 m platform on floorWood doorstep height 0.4 mOpen space15 m corridor**Scoring:**  Successful performance (Y/N), time (seconds), and/or physical strain (peak HR) are recorded.Ability score (0-8 or 0-9): number of tasks completed adequately. For 3 tasks, 0.5 may be awarded if it is partially completed. For the 8-item version: Performance time score: sum of the times taken during “figure-of-8-shape” and “15m-sprint” Physical strain score: mean peak HR between 3% & 6% slope tasks, expressed in bpm or %HRR  |

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| Availability

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| Available for free here:[*http://www.scireproject.com/wp-content/uploads/worksheet\_wheelchair\_circuit.docx*](http://www.scireproject.com/wp-content/uploads/worksheet_wheelchair_circuit.docx)**Languages:** English |

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| **Assessment Interpretability** |
| Minimal Clinically Important Difference

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| **Minimal Detectable Change**: Performance Time (s): Figure-8: 4.1 Crossing Doorstep: 6.1 Mounting Platform: 6.2 Sprint: 1.5 Transfer: 33.8Peak Heart Rate (bpm):  Figure-8: 18.9 Crossing Doorstep: 17.7 Mounting Platform: 21.3 Sprint: 20.9 Walking: 12.2 3% Slope: 25.5 6% Slope: 18.5 Wheelchair Driving: 19.2 Transfer: 25.7(Calculated from Kilkens et al., 2002; N=27; mixed injury types; final stage of clinical rehabilitation) |

 | Statistical Error

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| **SEM**: Performance Time (s): Figure-8: 1.5 Crossing Doorstep: 2.2 Mounting Platform: 2.3 Sprint: 0.6 Transfer: 12.2Peak Heart Rate (bpm):  Figure-8: 6.8 Crossing Doorstep: 6.4 Mounting Platform: 7.7 Sprint: 7.5 Walking: 4.4 3% Slope: 9.1 6% Slope: 6.7 Wheelchair Driving: 6.9 Transfer: 9.2(Calculated from Kilkens et al., 2002; N=27; mixed injury types; final stage of clinical rehabilitation) |

 | Typical Values

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|  | **Ability score** | **Performance Time (s)** | **Physical strain (%HRR)** |
| **T1** | 4.9 (2.4) | 30.6 (16.1) | 43.8 (17.8) |
| 5.7 (1.8) | 28.7 (15.4) | 41.3 (16.8) |
| 2.7 (2.4) | 40.0 (17.3) | 56.0 (11.4) |
| 5.0 (2.2) | 34.1 (20.5) | 44.2 (15.3) |
| 4.8 (2.5) | 28.3 (12.2) | 43.5 (20.0) |
| **T3** | 6.2 (2.2) | 22.0 (10.6) | 35.4 (17.5) |
| 6.7 (2.0) | 19.4 (7.7) | 31.0 (14.4) |
| 5.1 (2.6) | 29.5 (13.8) | 53.2 (18.6) |
| 6.7 (1.6) | 23.2 (11.6) | 38.1 (18.1) |
| 6.0 (2.5) | 21.3 (1.0) | 33.6 (17.3) |

T1 – Admission; T3 – Discharge(Kilkens et al., 2004, 8-task version; N=74, 51 male; mixed injury types, majority paraplegic; no info on chronicity) |

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| **Measurement Properties** |
| Validity – **Moderate**

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| ***Moderate* correlation with Functional Independence Measure (FIM) – Mobility:**Ability Score: r = 0.517 (Admission), 0.519(Discharge)Performance Time Score: r = -0.466 (At admission), -0.396(At discharge)(Between admission and discharge; Kilkens et al., 2004, 8-task version; N=74, 51 male; mixed injury types, majority paraplegic; no info on chronicity)**Number of studies reporting validity data:** 1 |

 | Reliability – **Moderate to High**

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| ***High* Inter-rater Reliability:** ICC = 0.97 (Overall task feasibility / ability), 0.76-0.98 (Task feasibility / ability for individual items), 0.82-0.99 (Peak HRs) ***Moderate* to *High* Intra-rater Reliability:** ICC = 0.98 (Overall task feasibility / ability), 0.71-0.99 (Performance times), 0.68-0.96 (Peak HRs)(Kilkens et al., 2002; N=27; mixed injury types; final stage of clinical rehabilitation)**Number of studies reporting reliability data:** 1 |

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| Responsiveness |
| **Floor/Ceiling Effect:**Not established in SCI | **Effect Size:** Standardized Response Mean: 0.6(WC Ability score) 0.9 (Performance Time score)0.80(Physical Strain score)(Between admission and discharge; Kilkens et al., 2004, 8-task version; N=74, 51 male; mixed injury types, majority paraplegic; no info on chronicity) | **Number of studies reporting responsiveness data:** 1 |