MEASUREMENT CHARACTERISTICS AND CLINICAL UTILITY OF THE 6-MINUTE WALK TEST AMONG INDIVIDUALS WITH SPINAL CORD INJURY

Rachel Tappan, PT, NCS, Jason Raad, MS, Jennifer Moore, PT, DHS, NCS

Approximately 68% of individuals who sustain a spinal cord injury (SCI) regain walking ability.1 Many recent studies have indicated that individuals with incomplete SCI have much greater capacity to achieve independent ambulation if provided intensive walking training.2 As a result of this research, many rehabilitation efforts now focus on recovery of walking in patients with this potential. Only a few gait-related measurements have been tested for reliability and validity in the SCI population. The 6-Minute Walk Test (6MWT) measures the distance an individual can ambulate in 6 minutes. The test has been assessed for reliability and validity in many populations, and it has demonstrated excellent reliability and adequate to excellent validity in individuals with incomplete SCI. It has also demonstrated sensitivity to change in the acute stages of recovery and 6 months postinjury. Normative values allow clinicians to compare individuals with SCI to individuals without neurologic injury. The 6MWT is free and requires minimal equipment, which makes it feasible for routine use in clinical practice.

This Rehabilitation Measures Database summary provides a review of the psychometric properties of the 6MWT in the SCI population, including reliability, validity, and normative values. A full review of the 6MWT and reviews of over 100 other instruments can be found at www.rehabmeasures.org.

Please address correspondence to rehabmeasures@ric.org.

BIBLIOGRAPHY:


This instrument summary is designed to facilitate the selection of outcome measures by trained clinicians. The information contained in this summary represents a sample of the peer-reviewed research available at the time of this summary’s publication. The information contained in this summary does not constitute an endorsement of this instrument for clinical practice. The views expressed are those of the summary authors and do not represent those of authors’ employers, instrument owner(s), the Archives of Physical Medicine and Rehabilitation, the Rehabilitation Measures Database, or the United States Department of Education. The information contained in this summary has not been reviewed externally.

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# 6-MINUTE WALK TEST, Tappan

**Measure Name:** 6-Minute Walk Test  
**Acronym:** 6MWT  
**Summary Authors:** Tappan R, Raad J, Moore J

**Population Reviewed:** Spinal Cord Injury (SCI), others at www.rehabmeasures.org  
**Admin Time:** 6 minutes  
**Items:** 1  
**Score:** Distance walked

**Purpose and Administration Instructions:**
- Measures distance walked over 6 minutes
- Follow instructions as written on the 6MWT testing form (www.rehabmeasures.org)
- Patient is instructed to “cover as much ground as possible over 6 minutes”

**Required Equipment:** Stop watch and measuring wheel are recommended.

**Training Requirements:** None required

**Validity:**

Concurrent Validity: Excellent in incomplete SCI when compared to 10-Meter Walk Test, Walking Index for SCI II (WISCI II), and the Timed Up and Go

**Age and Gender Based Norms:**

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<th>Age</th>
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<th>Female</th>
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<tr>
<td>60-69 years</td>
<td>572m</td>
<td>538m</td>
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<tr>
<td>70-79 years</td>
<td>527m</td>
<td>471m</td>
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<tr>
<td>80-89 years</td>
<td>417m</td>
<td>392m</td>
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</tbody>
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**Responsiveness:**

The 6MWT was able to detect improvements in walking capacity in patients with ambulatory impairment during acute stages of recovery and six months post SCI. Similar results were not demonstrated for either the WISCI II or Lower Extremity Motor Scores (LEMS).

**Reliability:**

Inter/Intra-rater Reliability:
- Excellent in patients who were admitted to a rehabilitation hospital or attended ambulant check-ups, testing completed within seven days, testing completed within seven days
- Excellent in chronic incomplete SCI

**Reference Equation for Normative Values:**

Expected 6MWT distance (tested on people 40-80 years old):

- Women (m) = \((2.11 \times \text{height in cm}) – (2.29 \times \text{weight in kg}) – (5.78 \times \text{age}) + 667m\)
- Men (m) = \((7.57 \times \text{height in cm}) – (1.76 \times \text{weight in kg}) – (5.02 \times \text{age}) – 309m\)

**Score Interpretation:**
- Total distance walked over six minutes can reflect endurance and walking ability
- Utilization of the SRD provides insight into real change over two or more test administrations

**Considerations:**
- It is important to standardize the testing track; significant differences in walking distances could result from changing the number of turns required in the path
- Testing conditions should be consistent between test administrations, including any lower extremity bracing or assistive devices utilized
- Individuals must walk without physical assistance during the 6MWT
- Rest breaks are permitted during the assessment; however, breaks should be included as part of the six minutes needed to complete the test

**Abbreviations:**

- m: Meters
- SCI: Spinal Cord Injury
- SRD: Smallest Real Difference
- WISCI II: Walking Index for SCI II

**Cut-off Criteria:**

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<thead>
<tr>
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<tr>
<td>Excellent</td>
<td>≥ .6</td>
<td>≥ .75</td>
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<tr>
<td>Adequate</td>
<td>.31-.59</td>
<td>.40-.74</td>
</tr>
<tr>
<td>Poor</td>
<td>≤ .3</td>
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