Measurement Characteristics and Clinical Utility of the High-level Mobility Assessment Tool Among Individuals With Traumatic Brain Injury

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Approximately 5.3 million Americans live with disabilities related to traumatic brain injury (TBI).1 TBI causes a wide range of impairments; even high-functioning individuals with TBI often have physical impairments that impede their ability to return to their prior activities, including accessing the community and employment. Many outcome measures do not detect high-level deficits because of a ceiling effect. The High-level Mobility Assessment Tool (HiMAT) is a free, 13-item, unidimensional scale that measures mobility in people who can ambulate independently at least 20m without an assistive device.2 It assesses high-level activities, such as running and jumping, which are not typically included in other measures. It is clinically feasible, as it requires minimal time and equipment, requiring only a stopwatch, a brick, and 14 stairs with handrails. A revised 8-item version of the HiMAT eliminating the stairs items exists, but more studies are needed before recommendations for its use can be made.3

The HiMAT has excellent reliability and adequate to excellent concurrent validity with the FIM and Rivermead Mobility Assessment in individuals with mild to severe TBI.4-6 Standard error measurement and minimal detectable change data have been reported, which will allow clinicians to identify true change in an individual’s performance.4,5

A full review of the HiMAT and reviews of nearly 200 other instruments can be found at www.rehabmeasures.org.

BIBLIOGRAPHY

**Characteristics and Clinical Utility of High-level Mobility Assessment Tool**

**Measure Name:** High-level Mobility Assessment Tool  
**Acronym:** HiMAT  
**Summary Author:** Ward, I; Roth, H; Kaia, J; Tseng, R; Tappin, D

<table>
<thead>
<tr>
<th>Population Reviewed:</th>
<th>Admin Time:</th>
<th>Items:</th>
<th>Score:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBI, others reviewed at <a href="http://www.rehabmeasures.org">www.rehabmeasures.org</a></td>
<td>5 to 15 minutes</td>
<td>13</td>
<td>1/54 (min / max)</td>
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**Purpose and Administration Instructions:**
- A unidimensional scale designed to assess high-level motor performance in patients with TBI

**Required Equipment:**
- Stopwatch, tape measure, house brick or similar sized obstacle, 20 meter walkway, and a flight of 14 stairs with handrail

**Training:**
- None required; Read manual

**Validity:**
- **Concurrent Validity:**
  - *Excellent* concurrent validity with RMA for chronic TBI
  - *Adequate* concurrent validity with FIM for chronic TBI
- **Criterion Validity:**
  - *Adequate* criterion-related validity at 3 and 6 months post injury with the Rivermead Post Concussion Symptoms Questionnaire for mild TBI

**Reliability:**
- **Test-retest Reliability:**
  - *Excellent* in chronic TBI
  - *Excellent* in mild TBI
- **Interrater Reliability:**
  - *Excellent* in chronic TBI
  - *Excellent* in mild TBI
- **Internal Consistency:**
  - *Excellent* in chronic TBI

**Minimal Detectable Change (MDC):**
- **Chronic TBI:** MDC_{95} = increase of 4 points or decrease of 2 points on the total score of the HiMAT
- **Mild TBI:** MDC = increase of 4 points or decrease of 3 points on the total score of the HiMAT

**Standard Error of Measurement (SEM):**
- **Chronic TBI:** SEM = 1.36

**Scoring Instructions:**
- Circle the score for each item based on the corresponding time or distance
- Add each subtotal to calculate a total score

**Score Interpretation:**
- Higher scores indicate better mobility

**Considerations:**
- The HiMAT is appropriate in the acute stages post TBI when the patient is able to ambulate unaided
- The minimal mobility requirements for testing is independent walking over 20 meters without gait aids. Orthoses are permitted
- Revised HiMAT: 8-item revision to original test where the 4 stair items and the bounding onto the unimpaired limb are removed. Although found to be unidimensional, valid and have excellent internal consistency in chronic TBI, more studies are needed
- The revised HiMAT is a valid option for clinics without stairs (MDC = +/- 2 in Chronic TBI)

**Abbreviations:**
- TBI: Traumatic Brain Injury
- RMA: Rivermead Mobility Assessment
- FIM: Functional Independence Measure

**Cut-off Criteria:**

| Excellent | ≥ .6 | ≥ .75 |
| Adequate | .31-.59 | .40-.74 |
| Poor | ≤ .3 | < .4 |