



CLINICAL VALIDATION OF THE WALKING INDEX FOR SPINAL CORD INJURY (WISCI) SCALE: A PRELIMINARY REPORT

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ABSTRACT

Objective:

To demonstrate the validity of the WISCI scale in a clinical setting.

Design:

Prospective cohort

Participants/Methods:

Eligible participants included all complete and incomplete traumatic spinal cord injuries (ASIA A, B, C, D) admitted within one month of injury. Exclusion criteria included significant head injury, upper or lower extremity fracture, or presence of an immobilization device that interfered with ambulation. To validate the hierarchical ranking of the WISCI, lower extremity motor scores, WISCI level, and Functional Independence Measure (FIM) scores were assessed during inpatient hospitalization when there was a change in ambulatory status, at one-month post discharge and one-year post injury. WISCI progression was assessed for monotonic direction of improvement. Lower extremity motor scores and FIM scores were also correlated with the WISCI.

Results:

Sixty-three (ASIA A=34, B=9, C=10, D=10) subjects have been enrolled and have completed an average of 12 weeks. For motor complete subjects (A=34, B=9), forty-two out of 43 showed no progression from wheelchair status. For motor incomplete subjects (C=10, D=10), sixteen out of 20 showed a monotonic improvement (one direction) in WISCI levels. Improvement in lower extremity motor scores correlated with improvement in WISCI level in 14 out of 16 subjects.

Conclusions:

The preliminary results support the hierarchical ranking of the WISCI scale in a clinical setting. In addition, progression through the WISCI scale is correlated with improved lower extremity motor scores.

INTRODUCTION

At least 50% or more of individuals who survive a spinal cord injury (SCI) will have incomplete injuries, which is the experience of the Model SCI Centers (1) and our center over the past 20 years. As many as 86% of persons with incomplete injuries to the cervical region have the potential to walk community distances (200 feet) at discharge (4). With new advances in drugs (2,7), training (8) and potential spinal cord transplantation in the future, more people with incomplete and complete injuries may gain this functional capacity.

In the past decade, multicenter clinical trials (MCT) have shown promise by the demonstration of evidence-based outcomes to justify early intervention of drugs. Agents such as methyl-prednisolone (3) have been shown to improve the strength in the arms and legs and self care function, if given within 8 hours of injury. Demonstration of restoration of walking function however, was not found even though the increase in strength of the legs was greater than the arms in the MCT, and may be limited by the sensitivity of the scale (5). A recent report (5) of a new walking scale, which was found to be valid and reliable by an international group of experts, may demonstrate improvement of walking function in MCT because of increased sensitivity and precision. Such an outcome measure should have utility in current and futures studies, which demonstrates restored function as the result of pharmacological or medical rehabilitation interventions. The following study is proposed, because it addresses the "urgent need for development of more effective outcome measurement tools to test new medical rehabilitation interventions.

METHOD

Participants/Methods: Eligible participants included all complete and incomplete traumatic spinal cord injuries C4 – T12 (ASIA A, B, C, D) admitted within one month of injury that could be followed to one year post injury. Exclusion criteria included significant head injury, upper or lower extremity fracture, or presence of an immobilization device that interfered with ambulation. To validate the hierarchical ranking of the WISCI, lower extremity motor scores, WISCI level, and Functional Independence Measure (FIM) scores were assessed during inpatient hospitalization when there was a change in ambulatory status, at one-month post discharge and one-year post injury. WISCI progression was assessed for monotonic direction of improvement. Lower extremity motor scores and FIM scores were also correlated with the WISCI. The revised WISCI scale (6) of 21 levels approved by the original WISCI study group was utilized (see below in Tables 1 and 2). Motor scores determinations were blinded from WISCI scoring. WISCI levels were scored and hierarchical ranked from digital photo documentation by blinded observers.

TABLE 1:
Scoring Sheet (WISCI II)
(Walking Index for Spinal Cord Injury II)

Patient Name _____ Date _____

Check descriptors which apply to current walking performance, then assign the highest level of walking performance. (In scoring a level, one should choose the level at which the patient is safe as judged by the therapist, with patient's comfort level described. If devices other than stated in the standard definitions are used, they should be documented as descriptors. If there is a discrepancy between two observers, the higher level should be chosen.)

DESCRIPTORS

Gait: reciprocal _____; swing through _____

DEVICES	BRACES	ASSISTANCE
<input type="checkbox"/> // bars < 10 meters	<input type="checkbox"/> Long Leg Braces – Uses 2 Uses 1	<input type="checkbox"/> Max assist x 2 people
<input type="checkbox"/> //bars 10 meters	<input type="checkbox"/> Short Leg Braces – Uses 2 Uses 1	<input type="checkbox"/> Min/Mod assist x 2 people
<input type="checkbox"/> Walker – <input type="checkbox"/> Standard <input type="checkbox"/> Rolling <input type="checkbox"/> Platform	<input type="checkbox"/> Locked at knee _____ <input type="checkbox"/> Unlocked at knee _____	<input type="checkbox"/> Min/mod assist x 1 person
<input type="checkbox"/> Crutches – Uses 2 Uses 1	<input type="checkbox"/> Other:	
<input type="checkbox"/> Canes – Quad Uses 2 Uses 1		
<input type="checkbox"/> No devices	<input type="checkbox"/> No braces	<input type="checkbox"/> No assistance

WISCI Levels

LEVEL	DEVICES	BRACES	ASSISTANCE	DISTANCE
0				Unable
1	Parallel bars	Braces	2 persons	< 10 meters
2	Parallel bars	Braces	2 persons	10 meters
3	Parallel bars	Braces	1 person	10 meters
4	Parallel bars	No braces	1 person	10 meters
5	Parallel bars	Braces	No assistance	10 meters
6	Walker	Braces	1 person	10 meters
7	Two crutches	Braces	1 person	10 meters
8	Walker	No braces	1 person	10 meters
9	Walker	Braces	No assistance	10 meters
10	One cane/crutch	Braces	1 person	10 meters
11	Two crutches	No braces	1 person	10 meters
12	Two crutches	Braces	No assistance	10 meters
13	Walker	No braces	No assistance	10 meters
14	One cane/crutch	No braces	1 person	10 meters
15	One cane/crutch	Braces	No assistance	10 meters
16	Two crutches	No braces	No assistance	10 meters
17	No devices	No braces	1 person	10 meters
18	No devices	Braces	No assistance	10 meters
19	One cane/crutch	No braces	No assistance	10 meters
20	No devices	No braces	No assistance	10 meters

Level assigned _____

RESULTS

Sixty-three (ASIA A=34, B=9, C=10, D=10) subjects have been enrolled and have completed an average of 12 weeks. For motor complete subjects (A=34, B=9), forty-two out of 43 showed no progression from wheelchair status. For motor incomplete subjects (C=10, D=10), sixteen out of 20 showed a monotonic improvement (one direction) in WISCI levels. Improvement in lower extremity motor scores correlated with improvement in WISCI level in 14 out of 16 subjects.

DISCUSSION

These preliminary results support the hierarchical ranking of the WISCI levels by the Delphi face validity method reported by the international WISCI study group and the retrospective analysis of clinical population reported in the scale revision.

The 4 subjects that did not demonstrate monotonic (one direction) improvement only failed to do so for one level.

The correlation of increased lower extremity motor scores with the improvement of the WISCI level support the construct validity of the scale. A similar result has been demonstrated in chronic subject with incomplete reported at this meeting. (9) These initial results are encouraging and show promise that the validation required to prepare this scale for clinical trials is progressing satisfactorily.

The preliminary results support the hierarchical ranking of the WISCI scale in a clinical setting. In addition, progression through the WISCI scale is correlated with improved lower extremity motor scores.

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