

Clinical Problem Solving 1:

Using the Short Form Berg Balance Scale to Detect Change in Post Acute Stroke Patients

By Caroline Owen

November 12, 2015



Purpose

1. To present the physical therapy evaluation of a stroke patient in an acute care hospital
2. To present evidence for the Short Form Berg Balance Scale's ability to detect change in a male post acute stroke.

The Patient: Demographics

Age	62
Gender	Male
Race	Caucasian
Occupation	Amazon warehouse
Living Situation	One story apartment, no stairs, lives with girlfriend who is able to provide intermittent care
Tobacco	Current smoker, pack/day
Prior Level of Function	Sedentary, Independent with all mobility
Past Medical History	Hypertension, CAD with MIx3, HDL, Type II Diabetes, Arthritis
BMI	31.1

The Patient: Admission Findings

- Presented to ER after 4 days of falling towards one side and having speech difficulties.

- Vitals:

BP: 179/94	HR: 97	RR: 17	SpO2: 95%
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- Speech/Language: Mild dysarthria and unable to write

- Coordination: Dysmetria noted in UE and LE, ataxic gait

- Strength, sensation and reflexes all normal

- Imaging: Head CT revealed R Cerebellar stroke and 90% occlusion of left Internal Carotid Artery

The Patient: Physical Therapy Evaluation

- Sensation, ROM and strength (5/5) all normal
- Behavior:
 - Unpredictable
- Coordination:
 - Toe Taps: R and L Impaired
 - Heel to Shin: R and L Impaired
- Mobility
 - Supine to sit → min assist required
 - Sit to stand → min assist required
 - Bed to chair → min assist required

The Patient: Physical Therapy Evaluation

- Balance:
 - Berg Balance Scale Short Form: fall risk 10/28
- Gait training:
 - 200 ft with a rolling walker and CGA
 - multiple lateral missteps and consistently veering to the right



The Patient: Goals

- Supine to sit → complete independence
- Sit to stand → complete independence
- Bed to chair → complete independence
- Ambulate → independent with rolling walker for 200 ft



The Patient: Physical Therapy Interventions

- AROM:
 - Ankle pumps, LAQ, Hip flexion x 10 reps
- Durable Medical Equipment
 - Rolling walker recommended

Short Form Berg Balance Test

	Day 1	Day 2
Sitting to Standing	2	4
Standing Unsupported – eyes closed	2	2
Reach forward with outstretched arm	2	4
Pick up object from floor	2	2
Look behind over shoulders	2	2
Standing in tandem	0	0
Single Leg Standing	0	2
<i>TOTAL:</i>	<i>10</i>	<i>16</i>

Less than 23 = Risk for Falling

The Patient: Prognosis

Fair

Negative Factors

- Due to 6 co-morbidity risk factors
- Unwillingness to change lifestyle
- 3 previous MI
- 90% occlusion of left Internal Carotid Artery – Surgical intervention required

Positive Factors

- Noted improvement since first visit
- Family support



The Patient: Outcome

- Continue skilled acute PT
- Reevaluate patient after angioplasty and stent placement
- Progress towards safe discharge to home health therapy with the use of a rolling walker

The Short Form Berg Balance Scale

Designed to measure functional balance, primarily in standing, in older adults in the clinical setting

- Ability to maintain seven functional positions for a given amount of time
- Graded from 0, 2 or 4
 - 0 – unable to perform task
 - 2 – modifies task or unable to maintain for full time
 - 4 – able to perform task for full amount of time
- Score below 23 is risk for falling

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Less than 23 = Risk for Falling



Clinical Question

For a 61 year old male post cerebellar stroke, is the short Form Berg Balance Scale the best measure to detect change in functional balance in an acute care setting?



A Prospective Study of the Responsiveness of The Original and The Short Form Berg Balance Scale in People With Stroke

- Purpose: Examine the responsiveness of the Berg Balance Scale and its short form
- Prospective cohort: Repeated-measurements design

Chen, K. L., Chou, Y. T., Yu, W. H., Chen, C. T., Shih, C. L., & Hsieh, C. L. (2015). A prospective study of the responsiveness of the original and the short form Berg Balance Scale in people with stroke. *Clinical rehabilitation*, 29(5), 468-476.

14 vs. 7 Item Berg Balance Scale

Berg Balance Scale

- 14 functional tasks
 - 1 sitting, 13 standing
- Five point ordinal scale from 0-4
- 15-20 min to complete

Short Berg Balance Scale

- 7 functional tasks
 - 7 standing
- Three point scale rating 0, 2 or 4
- 7-10 min to complete

Methods

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Inclusion Criteria

- ➔ Diagnosis: cerebral hemorrhage, cerebral infarction, other
 - First onset of a CVA
 - Stroke within 14 days before admission (confirmed by CT/MRI)
 - Ability to follow commands
 - Ability to give consent

Exclusion Criteria

- Subsequent stroke during follow up
- ➔ Major disease during follow up

Methods

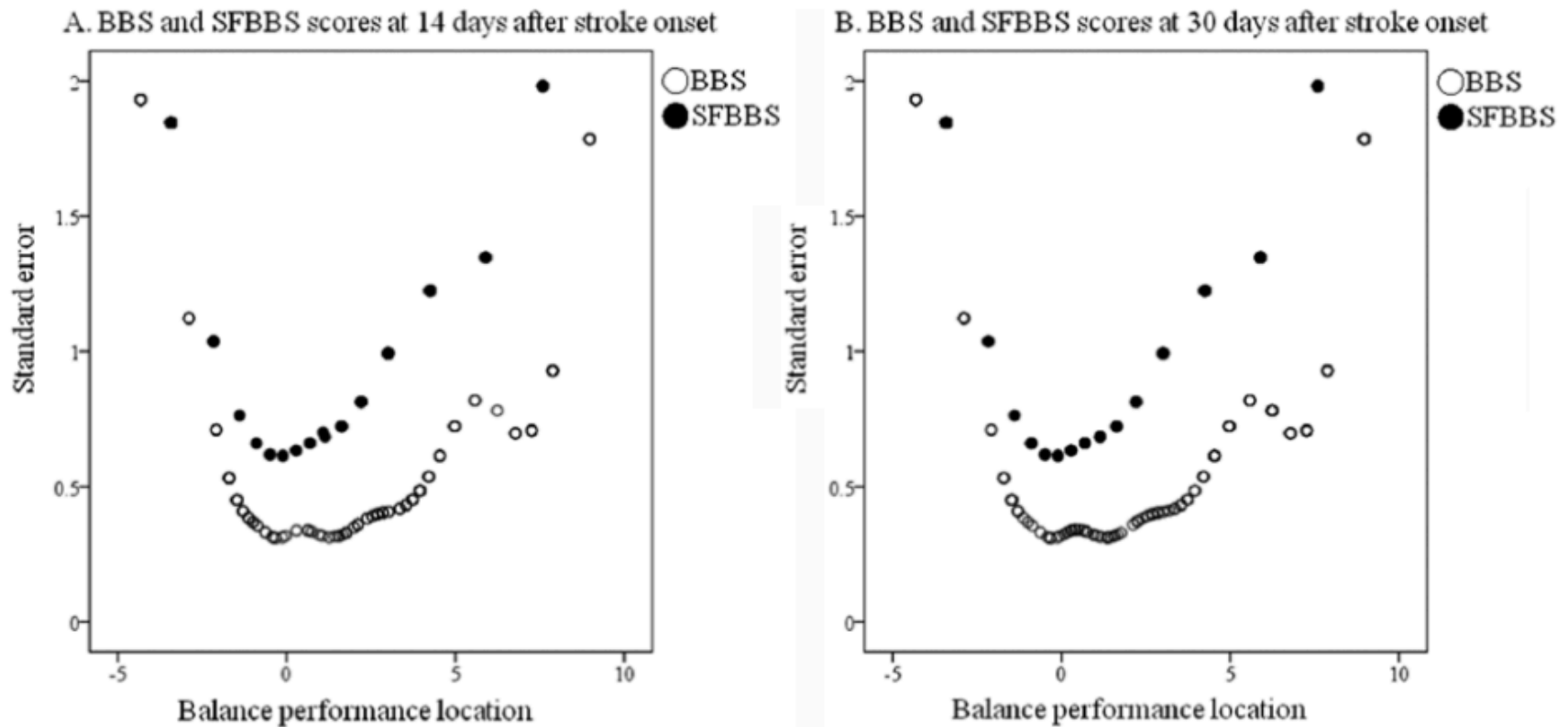
Chen, K. L., Chou, Y. T., Yu, W. H., Chen, C. T., Shih, C. L., & Hsieh, C. L. (2015). A prospective study of the responsiveness of the original and the short form Berg Balance Scale in people with stroke. *Clinical rehabilitation*, 29(5), 468-476.

- Patients were assessed with the Berg Balance Scale at 14, 30 and 90 days post stroke by an occupational therapist
- The score of the short form was determined by the data collected on the original scale

Days After Stroke	Patients Assessed
14	226
30	202
90	168

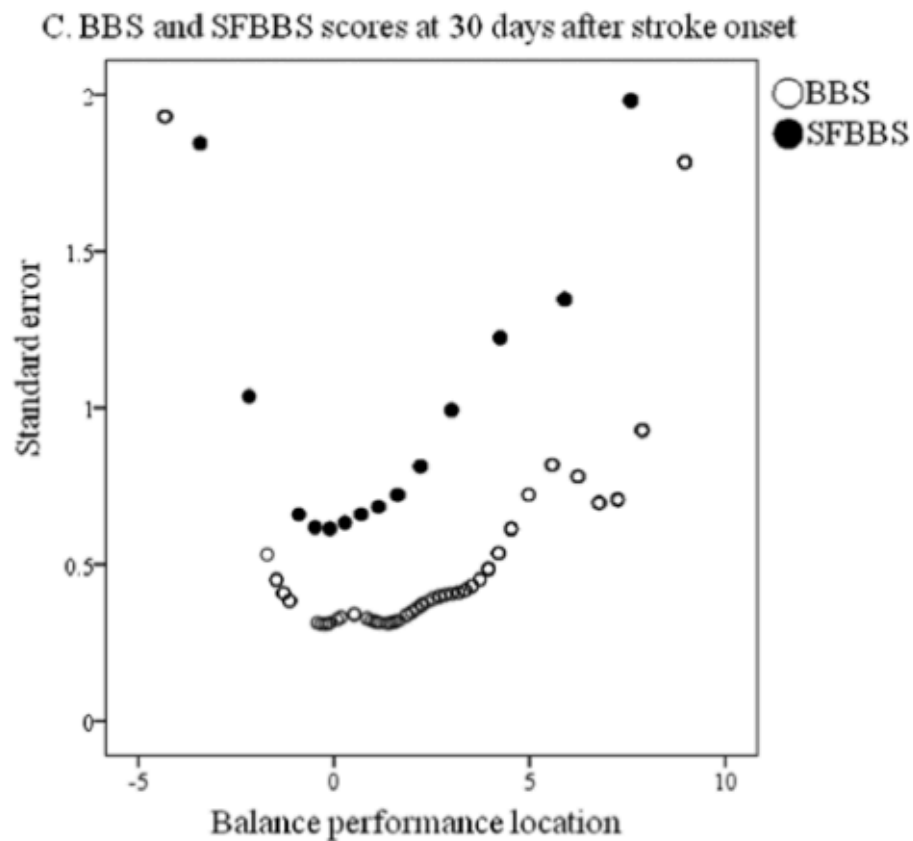
Results

Chen, K. L., Chou, Y. T., Yu, W. H., Chen, C. T., Shih, C. L., & Hsieh, C. L. (2015). A prospective study of the responsiveness of the original and the short form Berg Balance Scale in people with stroke. *Clinical rehabilitation*, 29(5), 468-476.



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- Standard error is greater for the short form
- Therefore, the confidence interval is smaller for the original
- **The original Berg Balance Scale is a better tool to detect change**

Limitations

Chen, K. L., Chou, Y. T., Yu, W. H., Chen, C. T., Shih, C. L., & Hsieh, C. L. (2015). A prospective study of the responsiveness of the original and the short form Berg Balance Scale in people with stroke. *Clinical rehabilitation, 29(5)*, 468-476.

- Findings limited to acute and sub acute patients with strokes
- Only a few patients deteriorated during the 90 day follow up
- The short form scores were derived from the original scale

Analysis and Comparison of the Psychometric Properties of Three Balance Measures for Stroke Patients

- Purpose: To determine the reliability, validity and responsiveness of three widely used post stroke balance measures from 14-180 days.
- Prospective cohort study
- Compared 3 clinical balance measures:
 - Berg Balance Scale
 - Fugl-Meyer test
 - Postural Assessment Scale for Stroke Patients

Mao, H. F., Hsueh, I. P., Tang, P. F., Sheu, C. F., & Hsieh, C. L. (2002). Analysis and comparison of the psychometric properties of three balance measures for stroke patients. *Stroke*, 33(4), 1022-1027.

Methods

Mao, H. F., Hsueh, I. P., Tang, P. F., Sheu, C. F., & Hsieh, C. L. (2002). Analysis and comparison of the psychometric properties of three balance measures for stroke patients. *Stroke*, 33(4), 1022-1027.

Inclusion Criteria

- ➔ Diagnosis: cerebral hemorrhage, cerebral infarction, other
 - First CVA without other major disease
 - Stroke within 14 days before admission
 - Ability to follow commands
 - Ability to give consent

Exclusion Criteria

- Subsequent stroke during follow up
- ➔ Major disease during follow up
 - Lived >40 miles from hospital

Methods

Mao, H. F., Hsueh, I. P., Tang, P. F., Sheu, C. F., & Hsieh, C. L. (2002). Analysis and comparison of the psychometric properties of three balance measures for stroke patients. *Stroke*, 33(4), 1022-1027.

- 123 stroke patients
- Balance measures taken 14, 30, 90 and 180 days after onset

Measured:

- Inter-rater reliability
- Validity
- Degree of Responsiveness

Results

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- Validity: Good
- Reliability: Good
- Responsiveness:
 - First 90 Days → moderate to high
 - 90-180 days → poor
 - Postural Assessment Scale for Stroke Patients was more responsive in the early acute stroke phase
- BBT showed significant floor (14 days) and ceiling (90 and 180 days) effects

Results

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Responsiveness of the 3 Balance Measures at Different Stages of Stroke Recovery

DAS	n	ES		
		PASS	FM-B	BBS
14-30	110	0.89	0.82	0.80
30-90	93	0.64	0.63	0.69
90-180	80	0.31	0.33	0.40
14-90	93	1.07	1.06	1.07
14-180	80	1.12	1.14	1.11

ES >0.8 is large, 0.5 to 0.8 is moderate, and 0.2 to 0.5 is small



Limitations

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- Intra-rater reliability not examined



Return to Clinical Question

For a 61 year old male post cerebellar stroke, is the short Form Berg Balance Scale the best measure to detect change in functional balance in an acute care setting?

No.



Application

Study 1: Original Berg Balance Scale vs. Short

- Concluded the original is better at measuring change

Study 2: Berg Balance Scale vs. Other Balance Measures

- During the acute phase of recovery in the hospital, the BBS was not as responsive as other measures examined.



Limitations in Application

- First measure taken at 14 days
- Diagnosis may have excluded this patient from the study
- Other disease may have excluded this patient from the study

Application

How would this change management of this pt?

- If using as a measure of change?
 - The original Berg Balance Scale > short form
 - Postural Assessment Scale > Original Berg balance Scale
- Evaluation of fall risk?
 - Use Short Berg Balance Scale



Questions?



References

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Methods

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- Data analyzed to determine both the group and individual responsiveness
- Group- Effect size and standardized response mean were used at a 95% confidence interval
- Individual – calculated the significant change of each subject
- Both used the paired t test to relate the scores of the original and short versions