

OCTH 6260-Spring- Assessment Rating Form

I. General Information

Title of the test: Four Step Square Test (FSST)

Author(s): Dite, W. and Temple, V.A.

Publisher: Archives of Physical Medicine and Rehabilitation

Time required to administer: Five Minutes or Less

Cost of the Test: Free. Although, there is required equipment for administration such as: a stopwatch, four canes, a gait belt, pen and a piece of paper.

II. Description of Test

Type/Purpose of Test: Clinically assesses the ability to change directions while stepping.

Population: For adults between the ages of 18-64 and elderly adults ages 65 and older. During the pilot studies that analyzed the usefulness of this measure, the population groups used were: ambulant people post stroke, unilateral transtibial amputees (lower limb amputation), older adults, and people with vestibular disorders.

Focus of measurement: Activities of Daily Living; Balance Vestibular; Balance Non-Vestibular

X Organic systems X Abilities X Participation/life habits Environmental Factors

III. Practical Administration

Ease of Administration: The authors of the measure provide a clear written prompt that is easy for administrators to follow. Patients are required to step over 4 canes set-up like a cross on the floor with the tips of the canes facing together. Repeat administration if the patient: fails to complete sequence successfully, loses balance, or makes contact with the cane.

Clarity of Directions:

Verbal Instructions are clear to understand:

“Try to complete the sequence as fast as possible without touching the sticks. Both feet must make contact with the floor in each square. If possible, face forward during the entire sequence.”

The test procedure may be demonstrated and one practice trail is allowed prior to the administration of the test. At the start of the test, the patient stands on the

upper left square (Square 1) and faces the direction of Square 2. The stepping sequence is (clockwise): Square 1, Square 2, Square 4, Square 3. Then (counterclockwise) Back to Square 3, Square 4, Square 2, and then end at Square 1.

Scoring Procedures: After the practice trial, two trails are performed. The better time (in seconds) is taken as the score. Timing of the measure begins when the patient's right foot contacts the floor in the square. It is important to note that patients who are unable to face forward during the entire sequence and needed to turn before stepping into the next square are still given a score.

Examiner Qualification & Training: No training is required for the administration of the FSST.

IV. Technical Considerations

Standardization: X Norms X Criterion Referenced ___ Other _____

Reliability:
(Test-retest Reliability)

1. Acute Stroke: (Blennerhassett & Jayalath, 2008)

| FSST Change Over Time: | | | |
|-------------------------------|---------------------------|---------------------------|---------------------------|
| | Initial to 2 weeks | 2 Weeks to 4 weeks | Initial to 4 Weeks |
| Participants: | <i>n</i> = 24 | <i>n</i> = 17 | <i>n</i> = 16 |
| Significance: | <i>p</i> = .008 | <i>p</i> = .01 | <i>p</i> = .01 |
| Difference | <i>d</i> = .26 | <i>d</i> = .08 | <i>d</i> = .33 |
| 95% CI | 0.4 to 5.2 | -3.4 to 5.8 | -2.0 to 10.7 |

2. Geriatric: (Dite & Temple, 2002)

- **Excellent** test-retest reliability (ICC = 0.98)

(Interrater/ Intratater Reliability)

1. Geriatric: (Dite & Temple, 2002)

- Excellent inter-rater reliability (ICC = 0.99)

Criterion Validity (Predictive/ Concurrent):

1. Acute Stroke: (Blennerhassett & Jayalath, 2008)

| FSST and Step Test Correlations: | | | |
|---|----------------|----------------|----------------|
| Tests Examined | Initial | 2 Weeks | 4 Weeks |
| Step test: right and left stance | .86* | .92* | .96* |
| FSST and step test right stance | -.86* | -.78* | -.81* |
| FSST and step test left stance | -.78* | -.73* | -.84* |

Spearman *rho* correlation coefficients
* $p < .01$

2. Geriatric: (Dite & Temple, 2002)

- Excellent concurrent validity with the Step Test ($r = -0.83$)
- Excellent concurrent validity with the Timed Up and Go test ($r = 0.88$)
- Fair concurrent validity with the Functional Reach Test ($r = -0.47$)

3. Vestibular Disorders: (Whitney et al. 2007)

- **Adequate** concurrent validity with the Timed Up and Go test ($r = 0.69$)
- **Adequate** concurrent validity with Gait Speed ($r = 0.65$)
- **Adequate** concurrent validity with the Dynamic Gait Index ($r = -0.51$)
- **Poor** concurrent validity with the Dizziness Handicap Inventory ($r = -0.13$)
- **Poor** concurrent validity with the Activities-Specific Balance Confidence ($r = -0.12$)

Manual: Not established for this measure, but it is available in PDF Format.

What is (are) the setting/s that you would anticipate using this assessment?

Outpatient Rehabilitation Centers and Community Settings.

Summary of strengths and weaknesses:

Weakness:

- No information is given about when the test is appropriate to administer post-injury.
- Does not offer other suggestions on what could be used if canes are not accessible.
- Information is provided in multiple resources, so it is difficult to gather all the information associated with the measure. The best solution is to Google "Four Step Square Test."

Strength:

- Fairly easy to follow and administer.
- The authors provided cutoff scores for each of the population groups involved in the pilot studies and the interpretation of those scores in seconds. For instance, geriatric patients who completes the test in greater than 15 seconds= at risk for multiple falls; for people with vestibular disorders who completes the test in greater than 12 seconds=at risk for falls; and lastly, for people with transtibial amputations who completes the test in greater than 24 seconds=at risk for falls.
- The availability of the articles relating to the test are easily accessible on PubMed or at <http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=900>
- A diagram for the set-up of the canes is available in Dite & Temple (2002)

Reference(s):

Blennerhassett, J. M. and Jayalath, V. M. (2008). "The Four Square Step Test is a feasible and valid clinical test of dynamic standing balance for use in ambulant people poststroke." *Arch Phys Med Rehabil* 89(11): 2156-2161.

Dite, W., Connor, H. J., et al. (2007). "Clinical identification of multiple fall risk early after unilateral transtibial amputation." *Arch Phys Med Rehabil* 88(1): 109-114.

Dite, W. and Temple, V. A. (2002). "A clinical test of stepping and change of direction to identify multiple falling older adults." *Arch Phys Med Rehabil* 83(11): 1566-1571.

Whitney, S. L., Marchetti, G. F., et al. (2007). "The reliability and validity of the Four Square Step Test for people with balance deficits secondary to a vestibular disorder." *Arch Phys Med Rehabil* 88(1): 99-104.