

Outcome Measures for the Clinician

Four Square Step Test (FSST)



Special contributions made by:

Jason Kahle - Jason Highsmith

Brian Kaluf - Tyler Klenow

Introduction

- Outcome measures are clinical tests that are used to evaluate a patient's level of function in certain rehabilitation domains including mobility, ambulatory status, and balance.
- The “Outcome Measures for the Clinician” series is designed to give the average clinician the tools to perform outcome measures in the clinic and use outcome measures to improve clinical evaluation, enhance clinical notes, and improve reimbursement for O & P interventions.
- Outcome measures can be used to show medical necessity for orthotic and prosthetic interventions by showing that a patient can:
 - Achieve a required milestone like variable cadence
 - Surpass a threshold of reduced fall risk
 - Return to a score that is average among a patient's normal peers
 - Improve a score by a clinically significant amount
- *References and information from this presentation may be copied into clinical notes and letters of medical necessity.
- *A comprehensive instructional video of the outcome measure will be included as part of this presentation.



Using Outcome Measures

- Outcome measures should be used in an initial evaluation of a patient to establish a baseline score for future comparison.
- A measure should be repeated after the delivery of an O & P intervention to show improvement in function and to show medical necessity
- Reasoning for use of an outcome measure should also be included in clinical notes including:
 - Validity
 - The ability of an outcome measure to test what it is intended to test
 - Reliability
 - The ability of an outcome measure to be consistently repeated
 - Minimum Detectable Change (MDC)
 - The smallest difference in a test score that can be determined to be significant
 - Normative Data
 - score ranges from normal and pathological populations from which to compare

Overview – Four Square Step Test

- Purpose: To assess dynamic stability and the ability of the subject step over objects forward, lateral, and backward¹

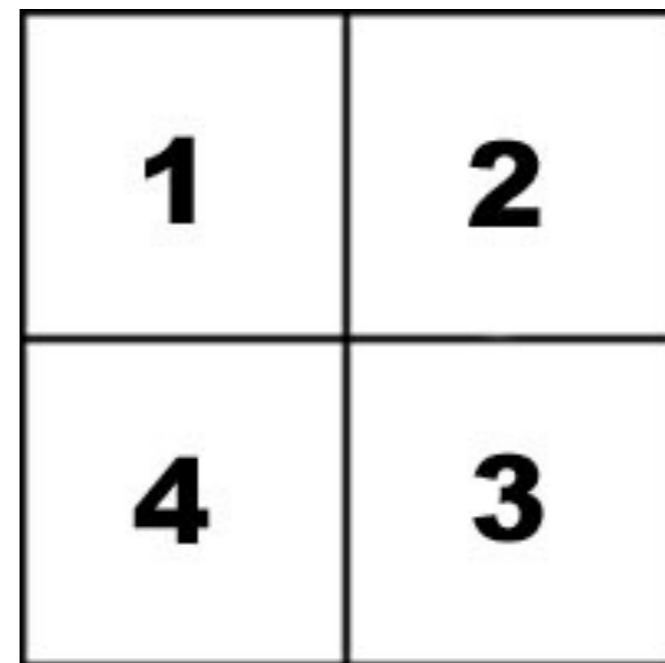
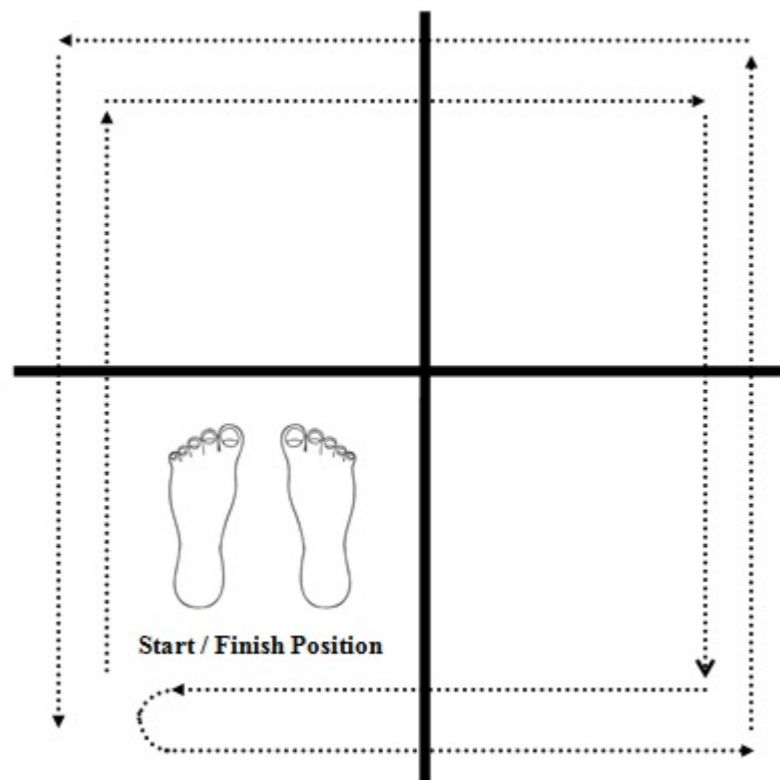
Four Square Step Test Psychometrics			
Reliable	Valid	MDC	Normative Data
Yes	Yes	Not Tested	Yes

Requirements – Four Square Step Test

- Time: < 5 minutes
- Equipment
 - 4 canes
 - Or 4 similar barriers
 - 2.5cm or 1 in. in ht.
 - Stopwatch
- Space
 - About 25 sq. ft.
 - Most patient rooms
- Personnel: 1-2 persons
- Cost: Free

Procedure – Four Square Step Test

- Subject begins standing in square 4
- Instruction: “As fast as possible without touching the canes touch both feet in each square clockwise and then counterclockwise to complete 1 trial”
- “Both feet must make contact with the floor in each square. If possible, face forward during the entire sequence.”
- Start time at 1st contact in square 1, end time when subject returns both feet to square 4
- 1 demo and 1 untimed practice trial
- 2 trials performed, best time recorded



- Illustration: <http://ci-journal.net/index.php/ciej/article/viewFile/767/901/4934>

Video – Four Square Step Test

Interpretation – Four Square Step Test

Threshold Values

Threshold Times Indicating Fall Risk by Population	
<u>Population</u>	<u>Threshold</u>
Lower Extremity Amputees	>24 sec. ⁵
Geriatric Population	>15 sec. ²
Acute Stroke	>15 sec. ⁶
Parkinson's Disease	>9.68 sec. ⁴

Validity

- Excellent for geriatric population²
- Excellent for Acute Stroke population⁶
- Adequate for Parkinson's Disease⁴

Normative Data

Balance and Mobility Times for Older Adults²	
<u>Multiple Fallers</u>	<u>Non-multiple Fallers</u>
32.6 sec +/- 10.1	17.6 sec +/- 8.3

FSST Times for Acute Stroke Patients⁶	
Mean +/- SD	20.8 sec +/- 15.0
Range	6.1-60.1 sec
Subjects w/ failed trials	62%

References – Four Square Step Test

1. Rehab Measures: Four Step Square Test.
<http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=900>. Center for Rehabilitation Outcomes Research Website. Published October 30, 2010. Updated November 19, 2014. Accessed January 6, 2015.
2. Dite W, Temple VA. A clinical test of stepping and change of direction to identify multiple falling older adults. *Arch Phys Med Rehab*. 2002; 83(11): 1566-1571.
3. Whitney SL, Marchetti GF, Morris LO, Sparto PJ. The reliability and validity of the four square step test for people with balance deficits secondary to a vestibular disorder. *Arch Phys Med Rehab*. 2007; 88(1): 99-104.
4. Duncan RP, Earhart GM. Four square step test performance in people with Parkinson disease. *J Neuro Phys Ther*. 2013; 37(1): 2-8.
5. Dite W, Connor HJ, Curtis HC. Clinical identification of multiple fall risk early after unilateral transtibial amputation. *Arch Phys Med Rehab*. 2007; 88(1): 109-114.
6. Blennerhassett JM, Jayalath VM. The four square step test is a feasible and valid clinical test of dynamic standing balance for use in ambulant people post-stroke. *Arch Phys Med Rehab*. 2008; 89(11): 2156-2161.

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