Five times sit to stand test (FTSTS)

CVA and Parkinson Disease
Five times sit to stand test (FTSTS)

- **Stroke**
  - Recommended for inpatient and outpatient rehab as well as acute care
- **Parkinson’s Disease**
  - Highly recommended for in H and Y stages 1-4
- **G code**
  - Changing and maintaining body position
FTSTS

- Purpose of test
  - Originally developed to assess LE strength now also used to assess function

FTSTS

- Equipment needed
  - 43 cm height chair (17 inch chair)
  - Stop watch
FTSTS

• How to administer
  • All subjects begin by crossing their arms on their chest and sitting with their back against the chair
  • Provide the following instructions: “I want you to stand up and sit down 5 times as quickly as you can when I say 'Go'.”
  • Start timing when signaled “Go” and stop when the subject’s buttocks touched the chair on the fifth repetition.
  • Instruct to stand up fully between repetitions of the test and not to touch the back of the chair during each repetition.
Research

CVA
Reliability/Cut off scores

• 12 subjects one year post stroke, 12 healthy subjects over 50, 12 subjects between the age of 21-35

• Excellent interrater, intrarater and test-retest reliability

• Cut off scores of 12 seconds to determine healthy from subjects with stroke

Foot and Arm Placement

45 community dwelling subjects at least one year post stroke

- Seat height adjusted to leg length
- Normal-Hips 90, ankle neutral
- Posterior-feet 10cm back from normal
- Each subject performed each condition (order determined by random draw)
- This study did not determine the best position to perform the test but raised the question that standardizations of arm and leg positions should be established
- Kwong, P. W., Ng, S. S., Chung, R. C., & Ng, G. Y. (2014). Foot placement and arm position affect the five times sit-to-stand test time of individuals with chronic stroke.

Hands on thigh longer times than augmented arm

All posterior foot placements had shorter times
### Seat height and arm position

43 community dwelling subjects with history of at least one year post stroke.

- Each subject performed each condition with order randomly selected
- Subject sat with knee is 90 degrees. Knee height was measured
- Chair was adjustable but without arms

<table>
<thead>
<tr>
<th>Slower times</th>
<th>85% knee height</th>
<th>100% knee height</th>
<th>110% knee height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arms across chest</td>
<td>Arms across chest</td>
<td>Arms across chest</td>
</tr>
<tr>
<td>85% hands on thighs</td>
<td>100% hands on thighs</td>
<td>110% hands on thighs</td>
<td></td>
</tr>
</tbody>
</table>

Validity

• Has not been found to be valid measure of functional mobility and dynamic balance with stroke patients

• But has with elderly women (correlates with TUG); vestibular disorders (TUG and ABC)
  


Research

Parkinson Disease
Reliability

• 80 subjects, H&Y 1-4, tested during “on” phase
• Interrater Reliability .99
  • 2 raters simultaneously timed the subject
• Test-retest reliability .76
  • 7 days between testing

Cut off scores/Correlations

- 16 seconds discriminated between fallers and non-fallers
- Significantly correlated to 6MW, Freezing of Gait, balance confidence, Mini-Best, and 9 hole peg test

Bruininks-Oseretesky Test of Motor Proficiency-2\textsuperscript{nd} Ed. (BOT-II)
Bruininks-Oseretesky Test of Motor Proficiency-2\textsuperscript{nd} Ed. (BOT-II)

- Test of motor proficiency
- RH Bruininks & BD Bruininks (1978), 2\textsuperscript{nd} ed 2005
  - Developed by father/son team; Father is a psychologist; son is exercise science doctoral student
- 2\textsuperscript{nd} ed. standardized on 1,520 children over 1 year from Nov. 2004-May 2005
- Norms extended through 21 yrs 11 mths which covers the entire school-age range served under IDEA (IDEA 2004)
- ICF: body structure and activity
BOT-II
Norming based on 2001 census

- 12 age groups
- Equal number males and females
- Socioeconomic status (used mother’s educational attainments); closely matched US population
- Race/ethnicity stratified according to national census (African American, Hispanic, White and other)
- 4 regions of country (Northeast, North Central, South and West)
- Educational Placement: Used children with ADHD, Emotional/behavioral disturbance, Specific Learning Disability, Mental Retardation, Developmental delay; Speech/language impairment, other impairment
Reliability

• Internal Consistency reliability: 0.7-0.8

• Test-retest reliability of subtest:
  • Age 4-12 0.70
  • Age 13-21 0.69

• Test Retest reliability of composite score:
  • Age 4-12 0.80
  • Age 13-21 0.77
Validity

• Interrater reliability
  0.98-0.99 for manual coordination, body coordination and strength & agility
  0.92 for fine manual control
• Strong content validity, internal structure, and construct validity
Administration and Scoring
BOT-II

- **Purpose:** Assess gross and fine motor control skill in children
- **Format:** Direct Assessment and observation of child in structured environment.
- **Scoring:** Raw scores; standard scores, and age equivalents for each area. Overall GM and FM ages and scores.
- **Time:** 45 - 60 minutes for entire testing battery.
- 15 - 20 minutes for short form.
Construct and Structure

BOT-II

- Assesses proficiency in 4 motor-area composites
  - **Fine Manual Control**
    - Assesses motor skills involved in writing and drawing
  - **Manual Coordination**
    - Assesses reaching, grasping, manipulating objects with an emphasis on speed, dexterity and coordination of arms and hands
  - **Body Coordination**
    - Assesses balance and coordination of U/LEs
  - **Strength & Agility**
    - Assesses large Ms strength, motor speed and motor skills involved in maintaining good body position while walking and running
8 Subtests
BOT II

- Fine motor precision
- Fine motor integration
- Manual dexterity
- Bilateral coordination
- Balance
- Running speed and agility
- Upper limb coordination
- Strength
BOT-II

- For each subtest
  - Point Score
  - Standard Score
  - Percentile Rank
  - Stanine
  - Age Equivalent
    - Lowest possible
    - >4 yrs
  - Highest possible
    - 19 years and above

- Gross Motor Composite
- Fine Motor Composite
- Battery Composite
Descriptive Categories Corresponding to Scale Score, Standard Scores, Percentile Ranks, and Standard Deviations from the Mean

<table>
<thead>
<tr>
<th>Descriptive Category</th>
<th>Scale Score</th>
<th>Standard Score Range</th>
<th>Percentile Rank Range</th>
<th>Standard Deviation from the Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well–Above Average</td>
<td>23 or greater</td>
<td>70 or greater</td>
<td>98 or greater</td>
<td>2.0 or greater</td>
</tr>
<tr>
<td>Above Avg</td>
<td>20–24</td>
<td>60–69</td>
<td>84–97</td>
<td>1.0–(2.0)</td>
</tr>
<tr>
<td>Average</td>
<td>11–19</td>
<td>41–59</td>
<td>18–83</td>
<td>−1.0–(1.0)</td>
</tr>
<tr>
<td>Below Avg</td>
<td>6–10</td>
<td>31–40</td>
<td>3–17</td>
<td>−2.0– (−1.0)</td>
</tr>
<tr>
<td>Well–Below Avg</td>
<td>5 or less</td>
<td>30 or less</td>
<td>2 or less</td>
<td>−2.0 or less</td>
</tr>
</tbody>
</table>
Sensory Observations on BOT - 2

- **Tactile** - Not readily observable
- **Proprioceptive**
  - Running Speed and Agility
  - Thumb to Fingertip (eyes closed)
  - Touching Nose (eyes closed)
  - Stepping over stick
  - Pressure on pencil
  - During bilateral items, needing to have visual regard
Sensory Observations on BOT-2

• Proprioceptive (cont.)
  – Posture and tone

• Vestibular
  – Balance subtests
  – Jumping items; difficulty with feet off ground
  – Freedom of movement
Sensory Observations on BOT-2

• Motor Planning
  – Bilateral items may indicate motor planning
  – Watching hand position and movement on ball items

• Other
  – Speed processing
  – Rhythmicity of movement
Six Minute Walk (6MW)
6 min walk

• CVA
  • Highly recommended for inpt and outpatient rehab, acute care
• Parkinson Disease
  • Highly recommended for stage 1-4
• G Code
  • Mobility: Walking and moving around
• Pediatrics
6MW

• Brief Description
• How to administer
Research

CVA
Reliability/MDC

• High test-retest reliability
• MDC-52 meters (171 feet)
• Correlated with gait speed

Research

Parkinson Disease
MDC/Reliability

• 37 subjects with PD, H&Y 1-4, on medication
• MDC-82 meters (269 feet)
• Test-retest reliability- .96