Incorporating & Interpretation of Functional Testing & Training Across Patient Types

Date: Friday, September 30, 2016
Time: 1:00 PM - 3:00 PM

Session ID & Location: 3C: Ballroom H
CEU Eligibility: 0.20

Presented by: Scott Lowe, PT, DPT, ATC, CEAS, CFE

Session Description: This presentation will be lecture–based with demonstrations of various functional tests and training techniques. The first half will consist of methods and rationale for the use of different tests and measures as well as interpretation of findings. Afterwards concepts for addressing deficits found will be discussed with several real–life patient vignettes from initial evaluation to post–assessment measures.

This presentation will be primarily focused for the outpatient setting, but information will be applicable across many practice realms. Use of tests and training methods across different patient populations will be addressed, including athletes, injured workers and general orthopedics.

Learners will be able to identify which functional test elements are appropriate for different patient types including athletes, injured workers and those in the general orthopedic population. Participants will also learn how to complete intervention elements appropriate for improving tests found to be impaired. Evidence–based documentation will be discussed including how to incorporate functional test findings in examinations and assessments with ideas for utilization with different payor types.

Presenter Bio(s): Dr. Scott W. Lowe is a Physical Therapist and Clinic Director in Holly Springs, GA. His professional interests include Manual Interventions, Clinical Education, as well as Professional Issues and Advocacy. He has completed residency training in Orthopedics and is certified in Ergonomics Assessment, Functional Capacity Evaluation, Functional Movement Assessment and Athletic Training.
Pre- and Post-Test for Functional Testing and Training Course 9/30/2016, PTAG and TPTA Fall Meeting, Scott W. Lowe

1: For what purpose if the MCTSIB administered?
   A: Assessment of bimanual dexterity, measuring both speed and accuracy
   B: Determining global balance as well as integration of individual components
   C: Dynamic gait assessment
   D: Measurement of work function to extrapolate abilities throughout an entire work day

2: Which of the following assessments has been shown to predict future injury risk among athletes with no injury history?
   A: Functional Movement Screen
   B: Isokinetic Quadriceps testing
   C: Berg Balance Test
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3: You are treating a patient status post ACL reconstruction who is nearing return to sport. What percentage of distance achieved on the Triple-Hop test as compared to the uninvolved extremity would suggest readiness for return?

4: Occasional performance of a work task is defined as what range of percentages of a work day?
   A: 10-30
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   D: 25-50

5: True or False, a concussion sustained in adolescents (less than 18 years of age) should be managed more conservatively than one sustained in adulthood (18 years of age or greater)

6: You are treating a workers compensation patient in the outpatient setting and want to gather information related to prognosis for return to work. Which of the following measures has the best predictive value?
   A: Manual Muscle Testing
   B: TUG
   C: Repeated lifting testing
   D: VO2 Max
What is Functional Testing?

- Any test or measure that replicates a real-life activity that may be impaired by the condition for which they are seeking therapy services.
- In the International Classification of Functioning paradigm, Functional Movement Testing assesses Activity and Participation elements.
- No specialized training is required, but many different continuing education courses are offered on the topic.

Types of Functional Testing

- Functional Mobility: TUG, 30 Second Sit to Stand Test
- Hand Function: Gripping, dexterity, coordination
- Balance: Romberg, Y-Balance, Single Leg Stance
- Work Tasks: Lifting, Carrying, Kneeling/Crouching
- Global Movements: FMS, FCEs, Ergonomic Assessments
- Athletic Tests: Triple-Hop, Cone Drill
30 Second Sit to Stand Test

- Measure of strength, control and balance with good normative data available for general geriatric population as well as those with OA.  
- Measure full repetitions of sitting and standing completed in 30 seconds without assist from arms.  
- Standardized set-up is 17” chair

30 Second Sit to Stand Test Test Results

Grip Strength Testing

- Commonly used for many upper extremity injuries  
- Good predictive use for future morbidity and mortality in the geriatric population  
- Can be used to determine reliability of effort  
- With testing of grip positions 1-5 on standard unit, highest strength will usually be on positions 2 or 3 with bell-curve distribution  
- 3 repetitions of each position will also aid with assessing reliability of effort

Grip Strength Testing Test Results

Peg Turning Tests

- Nine Hole Pegboard test is one of the most common tests and is easy to administer.  
- Participant is timed on placing all 9 pegs in holes and then removing. Compare involved and uninvolved sides.  
- Good normative data and clinically important change scores are available for patients post-stroke and with Multiple Sclerosis, but comparison to healthy norms can be used for general population and to set goals.

Peg Turning Tests Test Results
For the basic Romberg Test, close stance with eyes open and eyes closed. Arms crossed is generally considered standard position but no literature has specifically set it as such.

- Normal is 30 seconds with no more than minimal sway.\textsuperscript{10,11}
- In addition to use with patients with adult neurologic conditions, data can be valuable for ankle stability and post-concussion assessment.

The Modified Clinical Test of Sensory Interaction in Balance builds on the Romberg by adding unstable surface condition for both eyes open and eyes closed.\textsuperscript{11,12}

- 30 seconds per condition is the goal.
- Most studied in Geriatric population as well as for those with neurologic and vestibular conditions, but may also give good proprioceptive information for patients with lower extremity conditions.

Work Task Specific Tests

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{physical-demand-characteristics-of-work.png}
\caption{Physical demand characteristics of work.\textsuperscript{93\textsuperscript{a} Leonard Matheson & Ministry of Labor}}
\end{figure}
Floor to Waist Lifting

Strong predictor of return to work in workers comp cases
Easy to explain to patients how this task relates to daily tasks.
Most valuable information may be from performing “Occasional Lifting” which is tested at 2 lifts in 10 seconds, followed by 10 seconds rest before beginning next round at higher weight based on clinical judgment (5-10# in general). Frequent Lifting is often extrapolated as 50-60% of occasional amounts13,14.

Crouching/Kneeling

Used as a measure of patient’s willingness to assume crouch or kneeling position as well as speed of transitional movements with arm.

• Standard procedure is timed measure of 6 repetitions from top of box to floor with hammer
• Three measures taken, generally only with use of dominant hand

Y-Balance Test

Used to compare contralateral lower quarter control away from the center of mass.
• Measured while standing on 1” block with leg movement into all 3 directions for each leg
• Most commonly used with athletes, but can be used with any patient who is able to complete the test safely.

• Good reliability of rating and has shown predictive value for injury risk among athletic population16,17
• Online training available from http://www.functionalmovement.com/certification/YBTLevel1
Functional Movement Screening

- Exercises to address deficits found on screen readily available online
- Has been shown to have predictive value for future injury risk among athletes and military populations
- Each test item gives information about multiple body parts and their interactions
- Can easily document score and compare with future reassessments
- Offered via in-person or online courses at http://www.functionalmovement.com

3 Cone Drill

- While not a traditional PT test/tool, it has been shown useful for assessment of athletic performance
- Cones placed 15' apart at 90 degree angles, from first cone run to middle, touch and return, then run around middle to last one, around it and back.
- For reference, mean for NFL draftees is 7.3+/-0.45 seconds

Triple Hop Test

Most researched for use after ACL reconstruction, but can be used for any lower quarter condition, provided that strength and balance are appropriate and that there are no contraindications.
Goal for Return to Activity is 85-90% of uninvolved side.
**Documentation of Findings**

- Worker’s Comp cases want to see functional measures, especially if related to job demands.
- Job Demands questionnaires should be given to all WC evaluations if not provided by employer or physician.
- Most commonly implemented measures for this population include lifting, crouching, grip strength and climbing.
- Medicare reviewers want to see functional measures related to functional mobility and/or ADLs.
- Good examples: TUG, 30 second sit-stand test, peg-turning test and 6 minute walk test.

**Concussion Function Assessment**

- In data published within the last year, a survey of 1,272 Physical Therapists in who practice in outpatient settings found that while profession-wide gains have been made in concussion management guideline awareness, “gaps still exist” in both knowledge and comfort levels for this population.
- With growth of concussion awareness, youth sports participation rates and direct access, concussions present both clinical and policy-related issues for Physical Therapists.

**Concussion Assessment Continued**

- As in any PT evaluation, Red Flags must be ruled out.
- Focal neurologic deficits
- Widened Pulse Pressure
- Cervical Spine Examination
- Balance measures of appropriate difficulty should be implemented, e.g. MCTSIB
- Many neurocognitive measures are readily available and easily administered, e.g. SAC and ImPact
- A starting point for improving comfort level with these patients is http://www.apta.org/StateIssues/Concussions
Return to Activity

- Now that we have assessed and found deficits in function, how do we focus our interventions accordingly?
- Many activities used as tests can be beneficial for functional training as well.
- Regardless of the patient, functional training must be specific to THEIR functions.
- Patient wants to be able to tell that activities within therapy are directed towards their goals.

Questions?

http://www.eoi.es/blogs/imsd/files/2015/05/common_sense_not_so_common_onesie.jpg

Functional Training

<table>
<thead>
<tr>
<th>Day</th>
<th>Activity allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No physical or cognitive activity until asymptomatic (rest)</td>
</tr>
<tr>
<td>2</td>
<td>Light aerobic exercise (e.g., stationary bike)</td>
</tr>
<tr>
<td>3</td>
<td>Sport-specific exercise (e.g., throwing football)</td>
</tr>
<tr>
<td>4</td>
<td>Non-contact drills (e.g., running for passes, dribbling ball downcourt)</td>
</tr>
<tr>
<td>5</td>
<td>Full contact practice (after medical clearance)</td>
</tr>
<tr>
<td>6</td>
<td>Game play</td>
</tr>
</tbody>
</table>

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Further Study

• Functional Movement Screen and Y-Balance Test-functional movement.com
• Ergonomic Assessment: The Back School-thebackschool.net
• Functional Capacity Evaluation:
  - Arcon-fesoftware.com
  - Ergoscience-ergoscience.com

Conclusion

- Select a few tests such as the ones discussed today which may be most pertinent to the population you treat.
- You must have a firm foundational understanding of the "Why" to gain full use of these tests and treatments.

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References

1 Available at: https://www.cdc.gov/nchs/data/icd/icfoverview_finalforwho10sept.pdf


References continued


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