Recommendations on Risk of Falling Assessment Outcome of the GeriEDGE Workgroup
Thursday 2/6/14: 8-10 am APTA/CSM 2014

Physical Therapists, as experts in movement science, are uniquely qualified to contribute to identification of older adults likely to fall. While there are multiple measures being used to assess risk of falls and effectiveness of balance, the underlying clinometric of such measures have not been fully evaluated. The GeriEDGE task force on Risk of Falling Assessment was charged to identify and vet key risk assessment and outcome measures to be used for 1) screening for falls risk for older adults across the continuum of care, 2) assess outcomes of interventions aimed at improving balance and reducing risk of falling, and 3) provide guidance on interpreting measures for CSM severity coding.

Over the last year, the GeriEDGE performed a systematic review of the literature to identify key measures, assessed the strength of evidence on each measures clinometric properties, classified each measure as a risk vs. outcome tool, identified which subgroup of older adults or clinical setting the measure was most useful for, and made rated the strength of the measure, making a recommendation about its usefulness/interpretation in clinical practice. This presentation is the report on the process and outcome, to date, of the ongoing efforts of the GeriEDGE Workgroup, as a resource for physical therapists working with older adults.

Objectives: On completion of this seminar, participants will be able to:

1. describe the systematic review process as a means to evaluate current state of evidence about predicting risk of falls in community living older adults.
2. differentiate between concepts of postural control, performance on functional measures of balance, and risk of falling.
3. apply current evidence about clinometric properties to select the most appropriate measure of risk of falling and balance capacity for community living older adults
4. interpret established indicators of risk of falling (e.g., sensitivity and specificity, likelihood ratio, relative and absolute risk) to identify older adults in need of preventative physical therapy intervention.
5. select the most appropriate measures to determine risk reduction after physical therapy intervention for the older adults in their practice setting.
6. interpret scores on risk of falling and balance capacity measures for use as severity classification and change in function in documentation.
7. identify where further research is necessary to strengthen use of functional measures of postural control and balance, fall risk, and evidence of risk reduction for community living older adults.

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Presentation Outline

8:00 Tasks and Processes of the GeriEDGE Fall Risk Assessment Workgroup

8:15 Let's be clear: Conceptual Definitions

8:25 If we new then what we know now: undertaking a systematic review…

8:40 Best Available Evidence about Screening and Assessing of Risk of Falling Across

9:00 Best Available Evidence about Outcome Measures for Reduction of Fall Risk

9:20 What we still need to know… recommendations for future research

9:30 Interpreting the evidence: Documentation

9:45 Panel Discussion / Questions and Answers

10:00 Adjourn

Tasks and Processes of GeriEDGE Fall Risk Assessment Workgroup

1. History & Charge
2. APTA Dept. of Practice Funding Support
3. GOAL: ID best fall "FALL predictors/risk indicators (epidemiology) based on OCCURANCE (from literature)" AS PRIMARY OUTCOME OF INTEREST

Conceptual Definitions

1. Postural control versus Balance
   Traditional Definition
   - *Static*: ability to maintain upright posture against gravity
   - *Anticipatory/dynamic*: ability to prepare for movement and make appropriate postural adjustments during functional activity (internal perturbations)
   - *Reactionary/dynamic recovery*: ability to respond appropriate adjustments to unanticipated environmental challenges during functional activity (external perturbations)

   Shumway-Cook & Woollacott definitions (p. 162, Motor Control, 4th Ed, 2012)
   - *Postural orientation*: ability to maintain appropriate relationship between body segments, and between body and environment in order to perform a given task
   - *Postural stability* (balance): ability to manage the body's center of mass in relationship to its base of support; differs across different activities and environmental conditions
2. Fall: *unintentional* change in position to a lower level
   - Usually defined in the literature as to the floor
   - Non-medical (ie, not syncope)
   - May/may not result in physical injury
   - Slips, trips, unexplained;
   - MULTIFACTORIAL
   - Interaction of individual, activity/task, and environmental conditions/characteristics
3. Risk of Falling:
   - Assumption: No individual has zero risk of future falls
   - Related to accumulation of physical impairments (inactivity, aging, disease), across multiple systems, over the lifespan, that may compromise efficacy of postural control
   - Relationships among screening, risk assessment, and use of measures as outcome assessment [path analysis example; Sullivan & Chen, Phys Ther 2011;91(2):1892-1904]

Undertaking a Systematic Review

- ICF Model to frame relationships between structure/function, activity, and performance
- IoM and PRISMA Guidelines for Systematic Review
- Inclusion/Exclusion Criteria
- Key Words and Search Strategies
- Evaluating the Evidence: Three tiered Process:
  - Outcome of Abstract Review (based on inclusion/exclusion criteria)
  - Assessing Quality of Articles (using appropriate critical appraisal tool)
  - Data Extraction
- Interpretation & Synthesis….

Challenges encountered:

- MANY possible measures
- MANY levels of measurement
- MANY conceptual definitions and constructs
- Inconsistent methods of instrument development and testing
- The relationship between improved balance performance on functional/outcome measures and reduction in risk of future falls is not clearly understood (although often assumed to be the same thing)
- While many measures have been evaluated for ability to distinguish between non-fallers vs multiple fallers (retrospective designs), there has been less evaluation of measures' ability to predict future falls (prospective studies)

***Fall Risk Screening*:**

- Goal: ID who needs further risk assessment within a population (e.g., ID subgroup with high risk)
- Quick data collection and scoring process
- Can be done by any trained individual
- Clinical application by professional is interpreting screening results
- Answers the question "does need for further assessment exist"?
- High sensitivity (goal: effectively rule out those not at risk).
- Characteristics: simple; low cost/no special equipment needed; often questionnaire vs. performance

***Fall Risk Assessment*:** (could be embedded within PT Evaluation, or could precede it)
Purpose: for each person in subset found to be at risk of future falls during screening:

- What particular factors place this individual at risk of a future fall?
- What is the magnitude/severity of this individual's risk of a future fall?
- Of those risk factors present, which are modifiable?
- What should be done about it: by PT, by referral to others if outside scope of PT practice (prioritization of care)
- Are there additional measurement needs per outcome tools?

Characteristics of effective fall risk assessment measures:

- typically performance based;
- clinically feasible (cost, time, equipment);
- multidimensional/multifactorial;
- clinimetrically sound.

Goal of evidence based cut scores for screening and for risk assessment:

- High sensitivity (Sn) to "rule out"
- High specificity (Sp) to "rule in"
- ROC curves to find best combination of Sn and Sp

Falls Risk Reduction Outcome Measures

What information should be considered in selecting optimal outcome measures for PT intervention aimed at reducing risk of falling?

- Does measure capture multiple dimensions of postural orientation and postural stability?
- Is there sufficient evidence of construct/concurrent validity?
- What is the level of measurement (continuous, ordinal, or nominal; range of possible scores, ceiling/floor effects)
- Are age- and gender- norms (typical performance) values available for comparison?
- Is there sufficient evidence of reliability? (inter-rater reliability, intra-rater, test-retest, ICC)
- How effectively does measure capture change in risk factors/level of risk?
  - Is evidence of responsiveness available? (MDC, MCID or at least SEM)
  - What evidence exists for interpretation of change in risk? (Sn, Sp, Odds, relative risk, positive and negative predictive values)
  - Are there confidence intervals available for statistics concerned with change in performance?
- What is the optimal interval between test administration for documentation of change?
- How consistent is evidence about the measure across studies?

***Possible Algorithm for Fall Risk Reduction Initiatives*:**

For all ambulatory adult $\geq$ 65 years in community

Screening:

1. Have you fallen in past 6 months (Medicare)? y/n
2. ID other key screens from literature (ex. Gait & balance measures)

If (+) screen: go to fall risk factor identification

1. Use evidence-based risk assessment tool (multifactorial)
2. Develop hypothesis: select additional EB test/measures as needed
3. Use results to trigger referral/consults, set goals, determine interventions, choose outcome measures

If intervention indicated

1. Select E-B outcome measures appropriate to examination findings
2. Collect data at baseline, interval, end of care
3. Interpret based on known clinimetrics for documentation

What we still need to know/where are the "holes" in the evidence (suggestions for future research)

- More prospective studies evaluating performance on measures (of fall risk, of postural stability) and occurrence of future falls
- Better evaluation of relationship between change in performance and change in level of risk
- Better evidence of clinimetrics of measures (MDC, MCID etc) to improve interpretation and ability to document efficacy of intervention
- Knowledge translation: How to facilitate accurate and effective incorporation of evidence from epidemiology literature on fall risk and from measurement/instrument development literature into clinical practice (documentation)