Slide 1

Gait and Balance Standardized Assessment in Geriatric Fallers

Dianna Saunders, MS, PT
Nicole Prieto, MSPT
NF/SG Veterans Health System
Gait and Balance Clinic
Gainesville, FL
Lenni Jo Yarchin, PT, DPT
Sports Specific Training and Rehabilitation
Orlando, FL

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Slide 2

Overview of Course

MORNING LECTURE
Where to begin?
Fall History and Screening
Review of Postural Control
Comparison of Balance Assessment Tools
Balance Evaluation Systems Test (BEST)

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Slide 3

Overview of Course

AFTERNOON
Berg, DGI, DVA: Quick Review
BEST Practice/ LAB
BEST Video Case Study

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The Balance Problem

- Falls are reported by 1 of 3 people 65 and older.
- Risk for fall increases significantly with age.
- 2 of 3 people who fall will fall again within 6 months.
- 1 of 5 people who fall are seriously injured

Consequences of Falls

- Falls are the leading cause of death from injury for people 65 and over.
- 1 of 4 of those who fracture a hip die within 6 months of injury.
- Fear of falling can result in significant lifestyle limiting changes and decreased quality of life.
- The most profound effect of falling is the loss of independent functioning.

2 Big Questions?

What do we need to know?

and

What tool(s) could we use?
Slide 7

**We need to ...**

- Understand Fall Risk Factors
- Know that History is Key
- Choose some simple Clinical Screening Tools
- Select a Standardized Assessment Tool

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Slide 8

**Risk Factors for Falls**

- Age
- History of falls
- Cognitive impairment
- Lower extremity weakness
- Balance problems

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Slide 9

**Risk Factors for Falls**

- Psychotropic drug use
- Arthritis
- Stroke/Neurological Disorders
- Orthostatic Hypotension
- Dizziness
Components that Contribute to Falls

- **Extrinsic Factors**
  - factors outside the person
  - i.e. environment, assistive devices and footwear

- **Intrinsic Factors**
  - factors originating with the individual
  - normal aging changes, diseases, medications

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**Intrinsic Factors**

Age related changes:
- Vision
- LE strength
- Reaction time – postural reflexes
- Sensory changes – proprioception, vibration, touch
- Vestibular function

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**Intrinsic Factors**

Polypharmacy
- Antihypertensives/diuretics
- Sedatives/hypnotics
- Antidepressants
- Alcohol

Fear of falling
Pain
Medical comorbidities

- Cardiac disease
- Pulmonary disease
- Neurologic disorders

Surroundings/environment

- Poor lighting
- Floors
- Stairs
- Pets

Assistive devices

Key To Evaluation: Falls History

- Ask about falls once year
- If 1 fall proceed with clinical screens
- If 2 or more falls consider further diagnostics and referral to PT
Key Falls Questions

- Number of falls in the past year (1 or multiple)
- Detailed circumstances
- Syncope?
- Dizziness
- Gait or balance problems

Example Interview

- 85 y/o male with diabetic peripheral neuropathy comes for routine check up.
- History goes as follows...

So What Tools Do We Want To Use?

- Multiple standardized assessment tools are available to use as:
  - basis for treatment, and
  - measures of progress and outcomes
- Due to time constraints and clinic waiting list, a brief screening tool can be useful to triage a patient
Slide 19

**Consider**

4 major intrinsic factors that may affect balance:

- **LE Strength** - especially hip abduction and ankle dorsiflexion
- **Visual acuity** - worse than 20/40 (6/12) doubles risk for hip fracture
- **Vestibular function** - over age 65, 50% of those with dizziness have BPPV
- **Sensory** - if you can’t feel your feet or you’re not sure where they are, could affect your balance

Slide 20

**Screening Tools**

- **Timed Up and Go (TUG)**
- **Single Leg Stance/Tandem Stance**
- **Romberg/Clinical Test for Sensory Interaction and Balance (CTSIB)**
  - Can lead you to the selection of a more comprehensive standardized measurement tool

Slide 21

**Timed Up and Go (TUG)**

- A measure of dynamic gait
- Takes approximately 1-2 minutes
- Requires only a chair and a stop watch
- Involves timing a person as they rise from a chair, walk 3 meters, turn, and return to the chair
Timed Up and Go

- <10 seconds = normal
- 11-20 seconds = WNL for frail elderly
- 14 seconds = risk for fall
- >20 seconds = impaired functional mobility
- >30 seconds = dependency in most ADL’s/mobility

- A simple screen for gait abnormality and possible fall risk
- Demonstrates basic functional mobility, including sit to stand, gait and turns.

Slide 23

Timed Up and Go

- Excellent intra-rater reliability and intra-rater reliability
- Moderate correlations of TUG with BBS, CTSIB and Tinetti
- A screen of balance abilities
- BUT, not enough detail to determine source of impairment

Slide 24

Tandem Stance or Single Leg Stance

- Demonstrate how significantly impaired postural stability may be when your base of support is decreased

- Situations such as:
  - Stepping up curbs
  - Walking up stairs
  - Swing phase during gait
  - Turning
Slide 25

- Quick screen of postural steadiness
- Takes less than 1 minute
- Normal even for age 65+ is 15-20 seconds

**Tandem Stance**

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Slide 26

- >30 seconds for younger than 60
- >28 seconds for those in their 60's
- >20 seconds for those in their 70's
- Abnormal is less than 5 seconds

**Single Leg Stance (SLS)**

- Performance of either task provides insight as to whether patient should be counseled about fall risks.

Slide 27

- A test of the body's sense of positioning
- Premise that at least 2 of the 3 sensory inputs are needed to maintain balance while standing
  - Proprioception (body position in space)
  - Vestibular function (head position in space)
  - Vision (used to monitor and adjust for changes in body position)

**Romberg**
Slide 28

**Romberg**
- Used for testing influences of proprioception and vestibular function
- Takes approximately 1 minute
- Requires only a stop watch
- Stand with feet together, arms at sides, up to 30 seconds with:
  - Eyes open
  - Eyes closed

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Slide 29

**Modified Clinical Test of Sensory Interaction and Balance (mCTSIB): A Variation on Romberg**
- Assesses reliance on various sensory systems in maintaining balance
- Simplistically, CTSIB demonstrates effects of decreased BOS and dependency on vision for postural stability
- Compliant surface pulls in elements of reliance on vision, and possible vestibular and/or proprioception impairments

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Slide 30

**Modified CTSIB**
- Need a stopwatch and a square of medium dense foam
- Good test-retest reliability, poor to moderate correlations with TUG
- Not established as reliable to valid functional measure for use with older community dwellers
All of these tools give us information on components of balance, but individually are not enough.