Falling Down:
Falls and Gait Disorders in Older Adults

Monica K. Crane, MD
Associate Director
Senior Assessment Clinic, Cole Neuroscience Center, UTMC
Alzheimer’s TN SYMPOSIUM 5/29/13

Objectives

1. Understand the prevalence and clinical importance of falls.
2. Understand risk factors.
3. Know how to conduct an office gait assessment.
4. Become familiar with different gait disorders.
5. Prevention.

Fall: coming to rest inadvertently on the ground or at a lower level.

• One of the most common geriatric syndromes.

• Most falls are not associated with syncope.
Q: Is falling a part of normal aging?

A: No. But falls are common in older adults.

How common are traumatic falls?

- 1/3 of older adults (65+) have traumatic fall.
- 50-66% of these falls occur at home.
- 30-56% of patients in long-term care settings fall within the first 6 weeks after admission.
- 50% of nursing home patients will fall.

References:


Why should we care?

• Falls are the #1 cause of accidental death in older adults.

• Up to 10% of patients with a hip fracture will die within 30 days of surgery and 30% will be dead within one year.


Why should EVERYONE care?

Fall cost Americans nearly $40,000,000,000 every year


Who is at risk?
Risk factors

- Age > 80
- Orthostasis
- Fear of falling
- History of falls/syncope
- Polypharmacy
  - Sedatives, opiates, benzodiazepines, anticholinergics, etc
- Gait instability
- History of CVA, PD, or dementing illness
- Alcohol
- Environmental
- Incontinence
- Visual impairment


Fear of falling

Q: Do older adults worry about falls?

A: 80% of older women preferred death to a “bad” hip fracture resulting in nursing home admission

BMJ2000;320doi: http://dx.doi.org/10.1136/bmj.320.7231.341 (Published 5 February 2000)

Common gait disorders


### Gait disorders at low sensimotor level

<table>
<thead>
<tr>
<th>Classification</th>
<th>Condition</th>
<th>Gait findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral neuropathy</td>
<td>Sensory ataxia</td>
<td>Uncoordinated (posterior column, peripheral neuropathy) Weaving or drunk gait</td>
</tr>
<tr>
<td></td>
<td>Vestibular ataxia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visual ataxia</td>
<td></td>
</tr>
<tr>
<td>Peripheral motor</td>
<td>Arthritis</td>
<td>Avoids weight bearing on affected side Painful hip may produce Trendelenburg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>gait (trunk shift over affected side)</td>
</tr>
</tbody>
</table>

### Peripheral neuropathy: B12 deficiency

- B12 deficiency associated with diminished proprioception and ataxia in adults; CBC may be normal
- Improvement within 2-3 mos of B12 Rx if any improvement at all
- Reversibility depends on severity and duration

### Alcohol and Gait Disorders

- Severity of gait disorder related to duration and quantity of alcohol consumption.
- Peripheral neuropathy and cerebellar degeneration may occur independently or simultaneously.
- Both gait & neuropathy may improve with abstinence.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Condition</th>
<th>Gait findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parkinson’s disease</td>
<td></td>
<td>Shuffling, hesitation, festinating, retropulsion, en bloc turns, arm swing ↓</td>
</tr>
<tr>
<td>Cerbellar ataxia</td>
<td></td>
<td>Wide-based, trunk sway, irregular stepping on turns</td>
</tr>
<tr>
<td>Cautious gait</td>
<td></td>
<td>Wide-based slow gait, shortened stride (looks like shuffling), maintains appropriate postural responses</td>
</tr>
<tr>
<td>Frontal &amp; white matter disease</td>
<td>Small vessel disease/ CVD FTD NPH</td>
<td>Gait ignition failure, short shuffling steps with arm swing intact; wide-based posture FTD – frontal gait: unable to maintain upright posture; autonomic failure; muscle atrophy</td>
</tr>
</tbody>
</table>

**Gait disorders at mid/high sensimotor level**

**Gait changes in Parkinson’s**

**Lewy Body Dementia**

– Symptoms and gait changes that resemble Parkinson’s.
– Degeneration of autonomic system.
– Considerable cortical degeneration similar to Alzheimer’s disease.
Gait management for PD

• Rule out drug-induced parkinsonism
• Rolling walker is usually most appropriate assistive device
• Exercise may improve balance & gait
• Avoid carrying items in arms

Cerebellar disorders

• Most often, vascular or alcohol-related
• Truncal ataxia without limb dysmetria often seen with atrophy or infarction of vermis.
• Individual muscle strength normal, tone normal; finger to nose, heel to shin often normal.
• Benzodiazepines worsen gait; 28-fold increase in fall risk!

Alzheimer’s disease

• Cautious gait
  – Hesitant, slow gait
  – With severe disease a gait apraxia occurs
• Visuospatial deficit
• Balint’s syndrome
VASCULAR DEMENTIA

Vascular dementia

- Large vessel disease (post-stroke)
- Small vessel disease
  - Executive function problems
  - Gait disorder
    - Gait ignition failure, short shuffling steps with arm swing intact, wide-based posture
  - Depressive symptoms
  - Emotional lability
  - Memory problems

Progressive supranuclear palsy (PSP)

**KEY FEATURES**

- **FALLS** and postural instability within 1st year of diagnosis.
- Vertical supranuclear ophthalmoparesis
  - Upward gaze paresis with abnormal saccadic eye movements.
- Axial rigidity
- Cognitive decline

Dudley Moore (1935-2002)
Office visit: HISTORY

- Fall time, location, pain
- Medications
- Vision problems
- Vestibular: dizziness, lightheadedness
- Auditory: decreased hearing, tinnitus
- Cerebellum: alcohol, movement disorder
- Basal ganglia: Slowed movements, tremor
- Sensory: imbalance in the dark, numbness
- Strength: proximal muscle weakness, leg/foot weakness, difficulty climbing stairs and getting out of a chair, fatigability

Gait specific physical exam tests

1. Finger to nose
2. Rapid alternating movements
3. Heal knee shin
4. Get up and GO
5. Hallway walk and tandem gait
6. Rhomberg test
7. Postural stability
8. Functional reach
1. Finger to nose (cerebellar)

- The patient is asked to touch their nose, then the doctor's finger in rapid succession.
- Hold your finger at the extreme of the patient's reach and move your finger to different locations.
- Repeat L side.
- Dysmetria = inability to perform point-to-point movements due to over or under projecting ones fingers.

2. Rapid alternating movements

- Have patient pronate and supinate the palms of his or her hands on the thigh. Once the patient understands this movement, tell them to repeat it rapidly for 10 seconds.
- Dysdiadochokinesis = inability to perform rapidly alternating movements.
- Dysdiadochokinesia is usually caused by MS or cerebellar lesions.
- Patients with other movement disorders (e.g. Parkinson's disease) may have abnormal rapid alternating movement testing secondary to akinesia or rigidity, creating a false impression of dysdiadochokinesia.

3. Heal knee shin

- With the patient supine (preferred) instruct him to place the right heel on left shin just below the knee; then slide heal down the shin to the foot and back. Repeat with L foot.
- An inability to perform this motion in a relatively rapid cadence is abnormal.
- Abnormal test if there is loss of motor strength, proprioception or a cerebellar lesion.
4. Get up and Go test

• Get up and Go Test
  – Record the time it takes a person to:
    1. Rise from a hard-backed chair without use of arms
    2. Walk 10 feet
    3. Turn
    4. Return to chair and sit down

• Normal if \( \leq 10 \text{ sec} \)
• Most frail elderly adults can complete in 11-20 sec
• \( \geq 14 \text{ sec} \) = increased falls risk
• \( > 20 \text{ sec} \) = recommend further eval

5. Hallway and tandem walk

Hallway walk
Observe the patient's:
1. Arm swing
2. Heel distance
3. Leg stiffness
4. Lifting of feet

Heel Walking: Sensitive way to test for foot dorsiflexion weakness

Toe Walking: best way to test early foot plantar flexion weakness.

Tandem gait: Walk heel to toe across the room.

6. Rhomberg Test

• Have patient stand still with their heels together. Ask the patient to remain still and close their eyes.

• If the patient loses their balance, the test is positive.
7. Postural stability

Have patient stand still with their heels together. Ask the patient to remain still with EYES OPEN.

If the patient loses their balance, the test is positive.

8. Functional Reach

- With feet shoulder width apart, raise arm 90 degrees to front and reach as far as possible while maintaining stability
- Inability to reach 7” is predictive of falls

How can I prevent a fall in my home?
Patient-specific strategies to reduce falls

• Environmental change
  – Lighting in halls, night lights
  – First floor setup
  – Add stair rails (25% of falls occur on stairs)

• Hazard reduction
  – remove rugs, use non-slip bathmats, safer footwear,

How can I lower my risk of a fall and a hip fracture?

• Get adequate calcium and vitamin D
  – from food and/or from supplements.
• Assistive devices if needed.
• Get screened and treated for osteoporosis.
• No physical restraints
  – Does not prevent falls
  – Increases morbidity, mortality, length of stay
• Exercise!!

LSVT BIG therapy
LSVT BIG™ in Parkinson’s

- Physical training program with large amplitude body movement (Bigness).
- Improves amplitude (trunk rotation/gait) that generalizes to improved speed (upper/lower limbs), balance, and quality of life.
- LSVT BIG is delivered by PT or OT in four 1 hour sessions/week for four weeks.
- LSVT BIG trials report improvement in motor movement months after the therapy was completed.


Exercise improves MOVEMENT!

Questions?

Oh... “This guy is falling.”
I totally misunderstood what she was saying.

Me too.