



جامعة
المنارة
MANARA UNIVERSITY

Falls

- Falls are a leading cause of morbidity and mortality in seniors.
- In Ontario, falls cause 600 deaths annually for those over the age of 65.
- Falls in the elderly are also the leading cause of injury admissions to Ontario acute care hospitals.



It has been reported that:

- 30% of community dwelling elderly persons fall each year
- 1/2 of these have multiple falls
- 45% of falls occur in residents in Long Term Care facilities

Why else are falls important?

- Fear of falling restricts activities
- Falls are often marker for underlying disease
- 6th leading cause of death
- 5-15 % falls lead to serious injury
- 1-2% of falls lead to hip fractures.

Aetiology (often multifactorial)

- Accidents and environmental hazards
- Drugs
- Dementia
- Syncope
- Seizures
- Lower limb weakness and deconditioning
- Dizziness and/or vertigo
- Vestibular disease
- orthostatic hypotension
- CNS disease



Age-Related Physiological Changes

- **Vision:**

Elements of visual function related to occurrence of falls include declines in:

- visual acuity (e.g., decreased ability to see clearly and particularly affects near objects).
- contrast sensitivity (e.g., difficulty seeing objects and ground surfaces that have low contrast, especially against a bright background).
- accommodation (e.g., inability to focus clearly on objects over a range of distances).

- dark adaptation (e.g., inability of the eye to adjust to low levels of illumination).
- color perception (e.g., inability to perceive, differentiate, and distinguish colors of objects in environment)
- glare recovery (e.g., inability of the eye to recover from intense illumination, such as bright lighting).
- depth perception (e.g., inability to judge distances and relationships among objects in the visual field)

Balance

The body's ability to maintain balance or postural stability during standing and walking is dependent largely on feedback received from the vestibular, visual, and proprioceptive systems.

Musculoskeletal

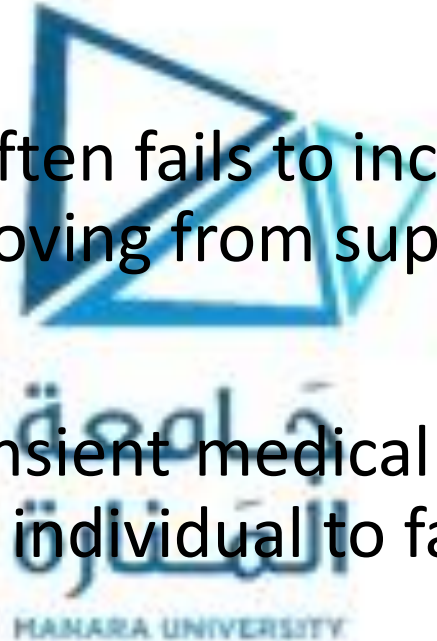
An older person's gait and balance are affected by a number of changes in the musculoskeletal system

Blood Pressure:

heart rate in older people often fails to increase in response to postural changes in position (e.g., moving from supine to sitting position).

medical conditions:

Virtually any chronic or transient medical problems that interfere with mobility may predispose an individual to falling.



Environmental Factors:

Several environmental obstacles, design factors, and host activities are associated with falling:

- transferring from low or high beds, chairs, or toilets.
- walking in poorly illuminated areas and tripping over low-lying objects or floor coverings, such as thick pile carpets or unsecured rug edges.
- slipping on waxed or wet ground surfaces.
- climbing or descending steps that lack handrail support or are difficult to see

Instructions: Ask the person to perform the following maneuvers. For each, indicate whether the person's performance is normal or abnormal.

Ask Person To:	Observe:	Response:
1. Sit down in chair. Select a chair with armrests that is approximately 16 to 17 inches in seat height	Able to sit down in one smooth, controlled movement without using armrests Sitting is not a smooth movement; falls into chair or needs armrests to guide self into chair	Normal Abnormal
2. Rise up from chair	Able to get up in one smooth, controlled movement without using armrests Uses armrests and/or moves forward in chair to propel self up; requires several attempts to get up	Normal Abnormal
3. Stand after rising from chair for approximately 30 seconds in place	Steady; able to stand without support Unsteady; loses balance	Normal Abnormal
4. Stand with eyes closed for approximately 15 seconds in place	Steady; able to stand without support Unsteady; loses balance	Normal Abnormal
5. Stand with feet together, push lightly on sternum two to three times	Steady; maintains balance Unsteady; loses balance	Normal Abnormal
6. Reach up onto tiptoes as if attempting to reach an object	Steady, without loss of balance Unsteady; loses balance	Normal Abnormal
7. Bend down as if attempting to obtain object from floor	Steady, without loss of balance Unsteady; loses balance	Normal Abnormal

Instructions: If the person uses a walking aid such as a cane or walker, the following walking maneuvers are tested separately with and without the aid. Indicate type of aid used.

8. Walk in a straight line, in your "usual" pace (a distance approximately 15 feet); then walk back	Gait is continuous without hesitation; walks in a straight line and both feet clear the floor	Normal (with aid) Normal (without aid)
	Gait is noncontinuous with hesitation; deviates from straight path; feet scrape or shuffle on floor	Abnormal (with aid) Abnormal (without aid)
9. Walk a distance of 5 feet and turn around	Does not stagger; steps are smooth, continuous	Normal (with aid) Normal (without aid)
	Staggers; steps are unsteady, discontinuous	Abnormal (with aid) Abnormal (without aid)
10. Lie down on the floor and get up	Able to rise, without loss of balance	Normal
	Unable to rise, or loses balance in the process	Abnormal



Falls Assessment:

Ask about:

- Past medical history
- How long falling; how much, and how serious?
- Exact circumstances of fall (accident, trip, “black out”, “legs just gave way”)
- Previous fractures with falling.
- Medications (Meds that can contribute include diuretics, antihypertensives, neuroleptics, antihistamines, antidepressants, long acting benzodiazepines)
- Do they consume ETOH? How much and how often?
- Collateral history can be very useful!



Physical Examination

- Look for an orthostatic drop (about 25% in patients who fall!)
- Pay attention to cardiovascular system; evidence of arrhythmia on taking their pulse? Aortic stenosis murmur?
- Concentrate on CNS examination; tremor and bradykinesia suggestive of Parkinson's disease? Focal signs of a previous stroke (weakness, upgoing toe, asymmetrical reflexes)? Impaired vibration sense or proprioception (suggestive of a peripheral neuropathy)

- Include gait assessment; examine the speed at which they move, distance between ankles/knees when they walk, if they shuffle when walking, or do not swing their arms. See if they touch the wall for balance, or wobble away from a straight line. Are their turns smooth, or do they trip over their feet
- If they use a mobility aid, examine it. Is their cane the right size for them (and is the rubber worn down?)? Do the brakes work on their walker?
- Don't forget cognitive testing (i.e. dementia impairing judgement, leading to falls)

Specialty Testing for Falls

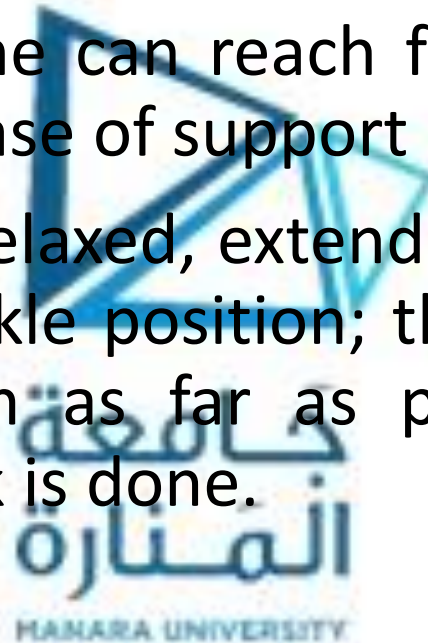
Timed “Get up and go” test,

- This is the time it takes for a person to stand up from a straight back chair, walk 3 m, and return and sit down.
- 10 seconds is normal, 11-20 is normal for a frail or disabled patient, and >20 seconds is abnormal and warrants further assessment



Functional Reach

- The maximal distance one can reach forward beyond arm's length, while maintaining a fixed base of support in the standing position.
- An older subject stands relaxed, extending their arm against a wall; a mark is placed at the knuckle position; they are then asked to stretch out and extend their arm as far as possible without losing their balance, and a second mark is done.



Older persons with a good reach have a better chance of avoiding falls if they can reach out 25 cm (10 inches) or greater; between 15-25 cm (6-10 inches), their odds ratio of falling is 2, if under 15 cm (6 inches), their risk of falling is 4, and if they cannot reach out at all, their odds ratio of falling is 8.



Laboratory investigations for falls:

- CBC, electrolytes, BUN, creatinine, glucose, calcium, albumen, TSH, serum B-12, and folate.
- Do an EKG
- Consider EEG if you suspect seizure activity
- Consider EMG's if you suspect a nerve conduction problem leading to a peripheral neuropathy



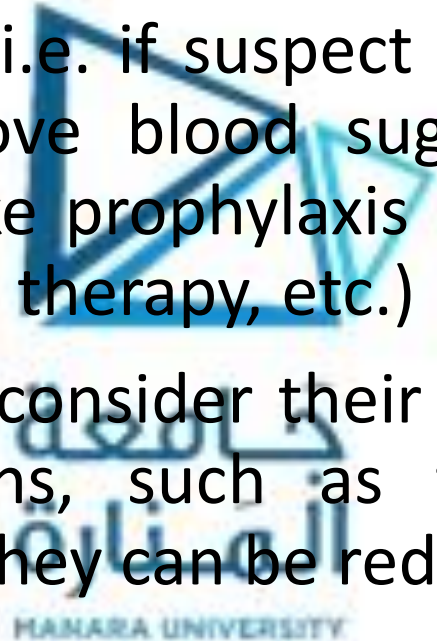
When to order a CT Head?

- Gait ataxia
- Focal neurological signs
- Primitive reflexes
- Cognitive Impairments

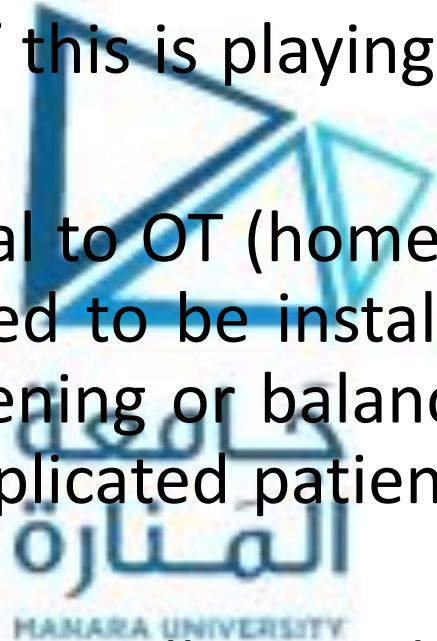


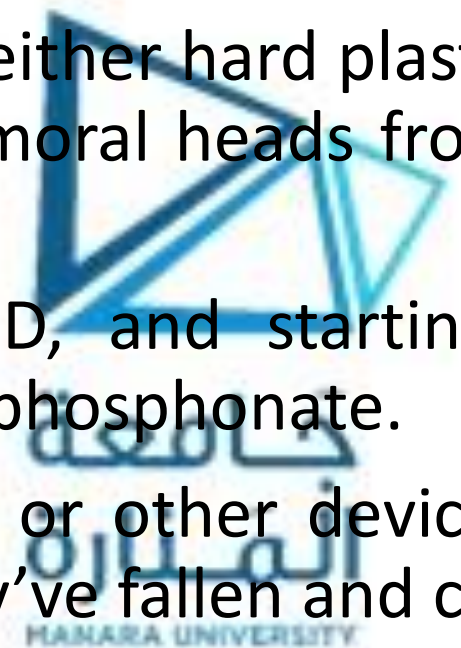
Management of Falls

- Treat underlying causes (i.e. if suspect Parkinson's Disease a trial of levodopa/carbidopa, improve blood sugar control if DM, start on anticoagulation for 2' stroke prophylaxis if in atrial fibrillation, if B-12 deficient, start replacement therapy, etc.)
- Review medications and consider their necessity (this may involving contacting other physicians, such as the Family MD and other specialists) and whether if they can be reduced or discontinued.



- Cut down or stop ETOH if this is playing a role (falls while inebriated, peripheral neuropathy)
- Rehabilitation with referral to OT (home visit to examine hazards and to see whether devices need to be installed or have the environment modified), PT (for strengthening or balance exercises), Day Hospital or Falls clinic referral (for complicated patients who need interdisciplinary approach)
- Enhance mobility (cane, walker, rails), improve vision, improve environment



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- Consider hip protectors (either hard plastic shell or soft foam “hockey pants” that protect the femoral heads from a direct blow if there is a fall).
 - Consider getting a BMD, and starting on calcium/vitamin D; if osteoporosis, start on a bisphosphonate.
 - Recommend a “Lifeline” or other device that the older person can use to signal for help if they’ve fallen and can’t get up.
 - If poor balance or deconditioning, train for preventing falls, by recommend they start Tai Chi, or joining a seniors fitness group

Rehabilitative Strategies

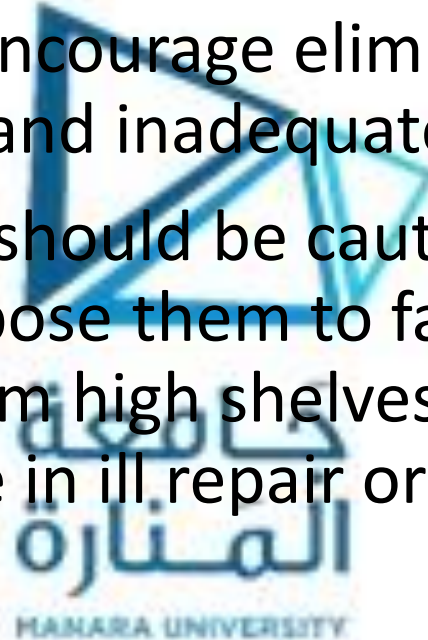
Rehabilitative strategies include therapeutic exercise, wearing proper footwear, and utilizing appropriate ambulation devices to assist with mobility.

Exercise programs can be grouped into two broad categories: general physical activity (e.g., walking, aerobic movements, and other endurance exercises) and specific physical activity (i.e., training geared specifically toward increasing balance and strength).

- Paying attention to shoe type and fit is important
- Stability is improved with shoes that have a thin and firm sole, rather than footwear with thicker soles, such as sneakers or running shoes.
- For those individuals with gait and balance disorders, canes and walkers can be used to maintain or improve mobility. Ambulation devices, such as a cane or walker, increase the elder's standing and walking base of support and stability.

Environmental Strategies

- health professionals can encourage elimination of slippery floors, bathtub surfaces or rugs, and inadequate lighting.
- At the same time, people should be cautioned to avoid hazardous activities that may predispose them to falls, such as standing on chairs to reach objects from high shelves, walking across wet floors, or using stairways that are in ill repair or are poorly illuminated.



Environmental Modifications to Reduce Risk of Falls

Floors

1. Avoid polish or wet floors
2. Use slip-resistant surfaces
3. Add nonslip adhesive strips
4. Use indoor–outdoor carpet
5. Use slip-resistant floor wax
6. Avoid thick or patterned carpet
7. Use double-faced tape at carpet edges



Walls

Add grab bars, especially in bath, hall, stairs (round, 16 to 26 inches high, color contrasted to wall, 2 to 3 inches from wall)

Lighting

1. Increase intensity by two to three times, especially in baths and stairways
2. Use three-way bulbs and rheostats
3. Use full-spectrum, fluorescent light
4. Add night lights and bedside lamps with secure bases
5. Add easy-to-find switches (accessible, contrasting color, pressure sensitive)
6. Use tinted windows, Mylar shades to reduce glare
7. Add automatic turn-on timers

Tables

1. Avoid unsteady tables
2. Avoid drop-leaf or pedestal styles
3. Use nonslip tops
4. Avoid low-lying, glass- and mirror-top tables

Shelves

1. Move frequently used items to middle shelves
2. Use reachers

Bath

1. Use grab bars, securely fastened
2. Use adjustable toilet seat, securely fastened, with vinyl with color contrast
3. Use nonslip strips in tub or shower
4. Install soap dispenser
5. Add hand-held shower hose



Bed

1. Place at easiest transfer height
2. If on wheels, lock and put on nonslip strips or immobilize legs

Stairs

1. Add rails, extended 12 inches beyond stairs and curved in at end
2. Add nonslip adhesive
3. Replace worn runners
4. Mark edges

Chairs

1. Tailor height to person
2. Feet should be firmly on floor; feet at 90 degrees; seat depth 15 to 18 inches
3. Armrests should be 7 inches above seat
4. Use sturdy chairs



Caregiver Strategies

Family members and other caregivers who interact with an older person who is at risk for falling are likely to develop excessive physical and emotional burdens.

Educational Strategies

The lack of awareness about falls and fall risks by older people is a major risk factor. Consequently, the main purpose of fall preventive education for older people is to increase their awareness of falls, risk factors, and strategies to reduce risks.