

Falls in the old people



Every 18 seconds an older adult is in
the emergency room because of a fall



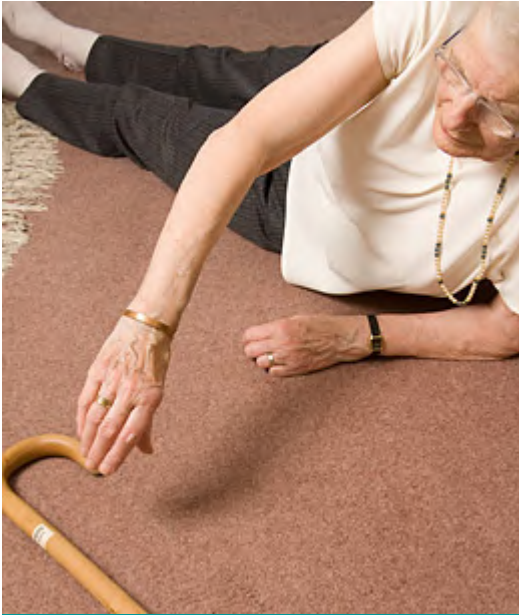
A fall results in a person coming to rest on the ground or another lower level; sometimes a body part strikes against an object that breaks the fall.

Typically, events caused by acute disorders (eg, stroke, seizure) or overwhelming environmental hazards (eg, being struck by a moving object) are not considered falls.

Most falls cause an injury; most injuries are minor, but some (eg, fractures, lacerations, head trauma) are serious.

Falls most commonly occur when several different problems (eg, unsteady gait, imbalance, lower-extremity weakness, slower reflexes, environmental hazards) interact to overcome an elderly person's ability to compensate.

After treatment of acute injuries, assessment aims to identify risk factors and appropriate interventions, thus decreasing the risk of future falls and fall-related injuries.



Elderly patients should be asked about falls at least once per year because many patients do not volunteer that information.

About $\frac{1}{2}$ of elderly people who fall cannot get back up without help, increasing their risk of dehydration, pressure ulcers, rhabdomyolysis, hypothermia, and pneumonia.

Lower-extremity muscle strengthening and balance training reduce risk of falls in elderly people.



Falls...

*Facts, Risks
& Solutions*

Intrinsic factors:

Age-related changes can impair systems involved in maintaining balance and stability (eg, while standing, walking, or sitting).

In the vestibular system, labyrinthine hair cells and nerve fibers are lost, preventing the brain from receiving vestibular sensory input.

Proprioception in the lower extremities declines. Visual acuity, contrast sensitivity, depth perception, and dark adaptation decline.

Changes in muscle activation patterns may impair the ability to maintain or recover balance in response to perturbations (eg, stepping onto an uneven surface, being bumped).

Extrinsic factors:

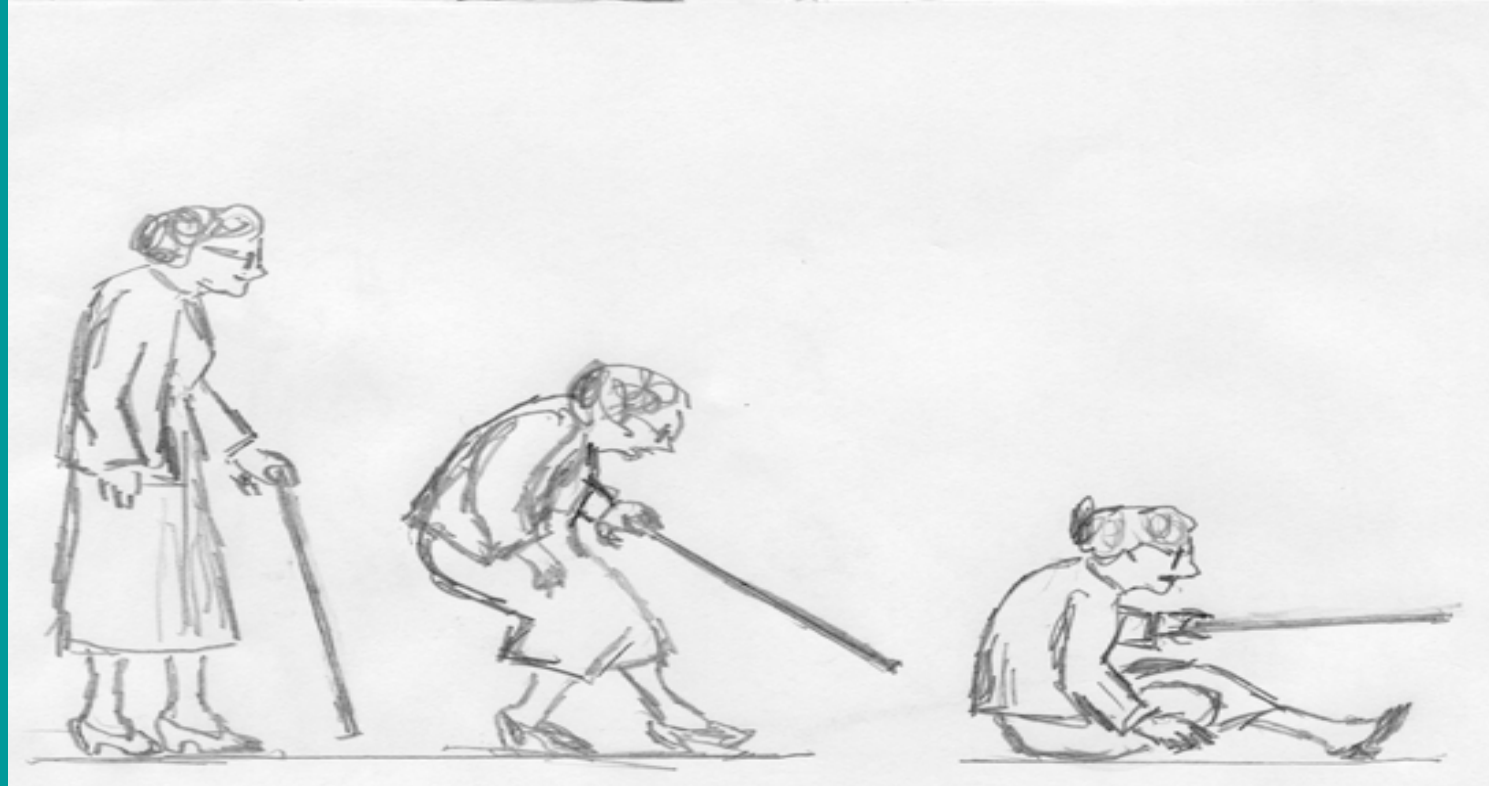
Environmental factors can increase the risk of falls independently or, more importantly, by interacting with intrinsic factors.

Risk is highest when the environment requires greater postural control and mobility (eg, when walking on a slippery surface) and when the environment is unfamiliar (eg, when relocated to a new home).

Situational factors:

Certain activities or decisions may increase the risk of falls and fall-related injuries.

Examples are walking in stocking feet or in footwear with high heels, rushing to the bathroom (especially at night when not fully awake or when lighting may be inadequate), and rushing to answer the telephone.



Complications

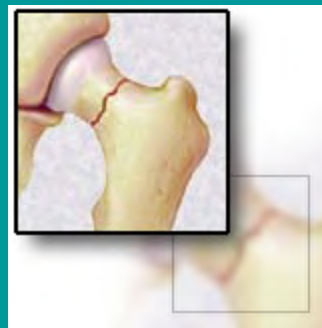
Over 50% of falls among elderly people result in an injury.

Although most injuries are not serious (eg, affect soft tissue), fall-related injuries account for about 5% of hospitalizations in patients ≥ 65 .

About 5% of falls result in fractures of the humerus, wrist, or pelvis.

About 2% of falls result in a hip fracture.

Other serious injuries (eg, head and internal injuries, lacerations) occur in about 10% of falls. Some fall-related injuries are fatal.



About 5% of elderly people with hip fractures die while hospitalized; overall mortality in the 12 mo after a hip fracture ranges from 18 to 33%.

Many elderly people who fall are frail and have preexisting deficits in activities of daily living and instrumental activities of daily living; these people are at increased risk of other complications after a fall.

About $\frac{1}{2}$ cannot get up without help.
Remaining on the floor for > 2 h after a fall increases risk of dehydration, pressure ulcers, rhabdomyolysis, hypothermia, and pneumonia.

Function and quality of life may deteriorate drastically after a fall; at least 50% of elderly people who were ambulatory before fracturing a hip do not recover their previous level of mobility.

After falling, elderly people may fear falling again, so mobility is sometimes reduced because confidence is lost.

Some people may even avoid certain activities (eg, shopping, cleaning) because of this fear. Decreased activity can increase joint stiffness and weakness, further reducing mobility. Falls reportedly contribute to 40% of nursing home admissions.

Diagnosis

Some falls are promptly recognized because of an obvious fall-related injury or concern about a possible injury.

However, because elderly people often do not report falls, they should be asked about them at least once per year.

Patients who report a single fall should be evaluated for a balance or gait problem using the **Get-Up-and-Go Test**.

For the test, patients are observed as they rise from a standard armchair, walk a fixed distance in a straight line, turn, walk back to the chair, and sit back down.

Observation may detect lower-extremity weakness, imbalance while standing or sitting, or an unsteady gait.

Patients who require a more complete assessment of risk factors for falls include those who have difficulty during the Get-Up-and-Go Test, those who report multiple falls during screening, and those who are being evaluated after a recent fall (after acute injuries are identified and treated).

History and physical examination:

Patients are asked about:

- the most recent fall or falls,
- when and where a fall occurred and what they were doing.
- whether they had premonitory or associated symptoms (eg, palpitations, shortness of breath, chest pain, vertigo, light-headedness) and whether consciousness was lost.
- whether any obvious extrinsic or situational factors may have been involved.
- past and present medical problems, use of prescription and OTC drugs, and use of alcohol.
- whether they could get back up without help after falling and whether any injuries occurred;

The goal is reducing the risk of complications due to future falls.

The physical examination should be comprehensive enough to exclude obvious intrinsic causes of falls.

If the fall occurred recently, temperature should be measured to determine whether fever was a factor.

Heart rate and rhythm should be assessed to identify obvious bradycardia, resting tachycardia, or irregular rhythms.

BP should be measured with patients supine and after patients stand for 1 and 5 min to rule out orthostatic hypotension.

Auscultation can detect many types of valvular heart disorders.

Visual acuity should be evaluated with patients wearing their usual corrective lenses if needed.

Abnormalities in visual acuity should trigger a more detailed visual examination by an optometrist or ophthalmologist.

The neck, spine, and extremities (especially the legs) should be evaluated for abnormalities, pain, and limitation in range of motion.

A neurologic examination should be done; it includes testing muscle strength and tone, sensation (including proprioception), coordination (including cerebellar function), stationary balance, and gait.

Basic postural control and the proprioceptive and vestibular systems are evaluated using the Romberg test (in which patients stand with feet together and eyes closed).

Tests to establish high-level balance function include the one-legged stance and tandem gait.

If patients can stand on one leg for 10 sec with the eyes open and have an accurate 10-ft tandem gait, any intrinsic postural control deficit is likely to be minimal.

Vestibular function and mental status should be evaluated.

Performance tests:

The Performance-Oriented Assessment of Mobility or Get-Up-and-Go Test can identify problems with balance and stability during walking and other movements that may indicate increased risk of falls.

Laboratory testing:

- a CBC for anemia,
- plasma glucose measurement for hypoglycemia or hyperglycemia,
- electrolyte measurement for dehydration.
- ECG, ambulatory cardiac monitoring, and echocardiography are recommended only when a cardiac cause is suspected.

Carotid massage under controlled conditions (IV access and cardiac monitoring) has been proposed to determine carotid hypersensitivity and ultimately who might respond to pacemaker treatment.

The most appropriate use of carotid massage may be in patients with recurrent, unexplained falls, especially when the history involves falls of the abrupt "drop attack" variety.

Spinal x-rays and cranial CT or MRI are indicated only when the history and physical examination detect new neurologic abnormalities.

Patients who report a single fall and who do not have problems with balance or gait on the Get-Up-and-Go Test or a similar test should be given general information about reducing risk of falls. It should include how to use drugs safely and reduce environmental hazards

Patients who have fallen more than once or who have problems during initial balance and gait testing should be referred to physical therapy or an exercise program.

Physical therapy and exercise programs can be done in the home if patients have limited mobility.

Physical therapists customize exercise programs to improve balance and gait and to correct specific problems contributing to fall risk.

Some patients benefit from use of an assistive device (eg, cane, walker). Canes may be adequate for those with minimal unilateral weakness, but walkers, especially 4-wheel walkers, are more appropriate for patients with increased risk of falls attributable to bilateral leg weakness or impaired coordination.

Physical therapists can help fit or size the devices and teach patients how to use them.

More general exercise programs in health care or community settings can also improve balance and gait.

For example, tai chi may be effective and can be done alone or in groups. Lower-extremity strength training helps many patients, but at least initially, such training should be supervised by a qualified therapist or trainer experienced in working with elderly people.

Drugs that can increase the risk of falls should be stopped, or their dosage should be adjusted to the lowest effective dose.

If a specific disorder is identified as a risk factor, targeted interventions are required.

For example, drugs and physical therapy may reduce risk for patients with Parkinson's disease.

Vitamin D, particularly taken with Ca, can reduce fall risk; this reduction is greater than the accompanying improvement in musculoskeletal function.

Pain management, physical therapy, and sometimes joint replacement surgery may reduce risk for patients with arthritis.

A change to appropriate lenses (single lenses rather than bifocals or trifocals) or surgery helps some patients with visual impairment.

Correcting environmental hazards in the home may reduce the risk of falls.

Elderly people should also be advised on how to reduce risk due to situational factors.

For example, footwear with flat heels and firm midsoles is a better choice than footwear with high heels.

Many people with chronic limited mobility (eg, severe arthritis, paresis) benefit from combined medical, rehabilitative, and environmental strategies.

Wheelchair adaptations (eg, removable foot plates to reduce tripping during transfers, antitip bars to prevent backward tipping), removable belts, and wedge seating may prevent falls in people with poor sitting balance or severe weakness when they are sitting or transferring.

Restraints should not be used.

Surveillance by a caregiver is more effective and safer.

Motion detectors may be used, but a caregiver must be present to respond to the triggered alarm.

Patients who have fallen repeatedly should be evaluated for osteoporosis and, if osteoporosis is diagnosed, treated to reduce risk of fractures from any future falls.

These patients should also be taught what to do if they fall and cannot get up.

Useful techniques include turning from the supine position to the prone position, getting on all fours, crawling to a strong support surface, and pulling up. Having frequent contact with family members or friends, a phone that can be reached from the floor, a remote alarm, or a wearable emergency response system device can decrease the likelihood of lying on the floor for a long time after a fall.