Falls in Older Adults

Indexing Metadata/Description

- **Title/condition:** Falls in Older Adults
- **Synonyms:** Falls in the elderly
- **Anatomical location/body part affected:** Fall-related trauma to various body parts, including the head
- **Area(s) of specialty:** Acute Care, Cardiovascular Rehabilitation, Pulmonary Rehabilitation, Home Health, Oncology, Neurological Rehabilitation, Orthopedic Rehabilitation, Geriatric Rehabilitation
- **Description**
  - A fall can be defined as an event that results in a person coming to rest inadvertently on the ground or floor or other lower level.[63]
  - In older adults, accidental falls are associated with low physical functioning, reduced postural and gait stability, slow righting responses, and orthostatic hypotension.[1]
  - One in five falls causes serious injury such as head trauma or fracture.[39]
  - Falls in older adults are seldom due to a single cause. Numerous intrinsic factors (e.g., orthopedic problems, poor balance, restricted mobility, peripheral neuropathy, depression symptoms, cognitive impairment), as well as extrinsic factors (e.g., environmental/situational hazards, certain medications), may contribute to postural instability and increase the risk of accidental falls
  - In community-dwelling older adults, falls typically occur during regular activity and involve outdoor or indoor situational hazards (e.g., stumbling on uneven ground, tripping on home obstacle or sidewalk curb, slipping on wet surface, using stairs or escalator, entering or exiting a vehicle).[2] Modification of fall risk factors in the physical environment likely helps to prevent older adults from falling
  - In nursing home residents, falls may involve situational hazards (e.g., a loose rug or object on the floor), but are more often associated with an uncontrolled transfer from bed to chair or chair to standing, or a lack of grab bars/assistive devices.[3] Restricted mobility is thus an intrinsic fall risk factor. Physical restraints (lap belts, geriatric chair) may be required to prevent falls in assisted-living older adults, but these should always be used according to state laws and/or hospital policy and directly supervised
  - Lower-extremity muscle weakness, functional deficits in proprioception, balance, and gait contribute to postural instability and falls in older adults.[1,5,6]
  - Therapeutic exercises and functional training that address specific impairments in strength and range of motion (ROM) to reduce deficits in transfers, posture, balance, and gait in older adults are effective in the prevention of falls.[7,8]

- **ICD-10 codes**
  - R29.6 tendency to fall, not elsewhere classified
  - W00 fall on same level involving ice and snow
  - W01 fall on same level from slipping, tripping, and stumbling
  - W03 other fall on same level due to collision with, or pushing by, another person
  - W04 fall while being carried or supported by other persons
  - W05 fall involving wheelchair
  - W06 fall involving bed
• W07 fall involving chair
• W08 fall involving other furniture
• W10 fall on and from stairs and steps
• W18 other fall on same level
• W19 unspecified fall
• Z91.81 history of falling

(ICD codes are provided for the readers’ reference, not for billing purposes)

› Reimbursement: Reimbursement for therapy will depend on insurance contract coverage. Several issues regarding reimbursement have been identified
• Most insurance coverage has a requirement of medical necessity, which some fall-prevention activities per se do not meet
• In the United States, Medicare is the primary payer for health care for older adults
  – Falls prevention is addressed across a range of Medicare regulations, initiatives, and coverage guidelines
  – Some Medicare claims processing contractors explicitly recognize Z91.81 and R29.6 (history of fall, at risk for falling) in their outpatient occupational therapy and outpatient physical therapy local coverage policies. Other contractors and plans may differ
  – Different reimbursement models exist under Medicare that govern provision of care to homebound and non-homebound patients. Many providers, such as hospital outpatient departments, do not allow for provision of care in the home
    - The physical therapist (PT) is responsible for following Medicare guidelines on frequency, duration, and certification to ensure payment
  – Medicare has implemented payment provisions as a financial incentive to prevent “hospital-acquired” conditions. Hospitals are no longer reimbursed for a higher paying diagnosis-related group (DRG) when it is a secondary diagnosis that could have been prevented. The inclusion of in-hospital falls as one of the selected “hospital-acquired”conditions that could have been prevented is controversial(29)
• Inquire about any ongoing legal claims

› Presentation/signs and symptoms
• First-time or recurrent faller
  – Recurrent falls are defined as more than one fall in a given period of time (usually 12 months)(62)
  – Using this definition, around 15% of people in the general older population are classified as recurrent fallers(62)
• Soft tissue injuries (bruises, lacerations)
• Fracture (for additional information, see Clinical Review of specific fracture [e.g., hip, humerus, clavicle])
• Cognitive impairment (for additional information, see Clinical Reviews on traumatic brain injury [TBI])
• Comorbidities (cardiovascular, neurological, musculoskeletal, metabolic, psychiatric)
• Use of an assistive ambulatory device
• Activity avoidance/restriction and mobility coping strategies due to fear of falling(8)

Causes, Pathogenesis, & Risk Factors

› Causes: Typically, there are multiple interacting causes(1)

• Intrinsic factors
  – Age-related decline in physical and executive functioning with reduced ability to engage in activities associated with risk of falling(9)
  – Chronic disease (multiple pathologies; see Pathogenesis, below) associated with postural instability due to:(65)
    - Lower extremity weakness/paresis
    - Restricted lower-extremity ROM
    - Pain in weight-bearing joints
    - Deficits in sensation, proprioception, and balance
    - Gait abnormalities
  – Frailty(70)
• Extrinsic factors
  – Medications\(^{(45,46)}\)
    - Antihypertensives, antidepressants, benzodiazepines, and opioids are the four most commonly used drug classes associated with an increased risk of falls or hip fractures in older adults\(^{(47)}\)
  – Anticholinergic medication has been associated with an increase in recurrent falls in women ages 65–79\(^{(66)}\)
  – Environmental hazards\(^{(65)}\)
    - Common indoor examples include loose unsecured rugs, clutter, poor lighting, pets, extension cords, and unstable furniture
    - Outdoor hazards include uneven terrain, cracked sidewalks, sloping driveways, slippery surfaces (wet or icy), and variable curb and step heights

› Pathogenesis
  • Postural control dysfunction results from impairment at one or more of the following levels: peripheral sensory systems, central nervous system (CNS), and effector organs\(^{(30)}\)
    – Dysfunction in peripheral sensory systems can cause impairment of vision, vestibular functions, and somatosensation
    – Dysfunction in CNS components can cause impairments in muscle perfusion, speed/attention, strength, and postural reflexes
    – Dysfunction in effector systems can lead to impairments in strength, flexibility, and endurance
    – Combinations of deficits across these systems may result in instability and falls\(^{(30)}\)
  • In older adults, chronic comorbidities that can contribute to impaired postural control may include:
    – Reduced vision and hearing\(^{(65)}\)
      - Visual impairments (e.g., decreased accommodation, night vision, acuity, peripheral vision, and contrast sensitivity; binocular visual field loss; cataracts; glaucoma)
      - Auditory impairments (e.g., wax accumulation, increased high-frequency threshold, or reduced speech discrimination)
      - Presbyopia requiring multifocal glasses (especially on stairs)
    – Neurological conditions associated with reduced balance and/or vertigo\(^{(1)}\)
      - TBI/postconcussion syndrome
      - Stroke
      - Parkinson’s disease (PD)
      - Multiple sclerosis (MS)
      - Peripheral or diabetic neuropathy
      - Vestibular disorders
      - Dementia
    – Musculoskeletal conditions\(^{(1)}\)
      - Decreased lower-extremity ROM
      - Muscle weakness, especially in the quadriceps and postural muscles due to primary muscle mass loss (sarcopenia) and/or disuse\(^{(65)}\)
      - Joint pain
      - Lower back pain\(^{(31)}\)
      - Neck pain may be associated with dizziness\(^{(31)}\)
    – Cardiovascular conditions associated with lightheadedness\(^{(1)}\)
      - Postural hypotension
      - Post myocardial infarction
      - Heart failure
      - Arrhythmias
      – Incontinence (i.e., urinary or fecal urgency)

› Risk factors
  • History of falling\(^{(42)}\)
  • Sleep disturbances – can lead to daytime disorientation and reduced ability to negotiate hazards in the physical environment
• Medications that alter consciousness (e.g., psychotropics) or are associated with drowsiness, dizziness, or lightheadedness (e.g., antihistamines, tranquilizers, antihypertensives, antidepressants, type I antiarrhythmics, diuretics)
• Cognitive impairment
• Depression
• Obesity
• Chronic pain
• Foot pain
• Chronic illness (e.g., diabetes mellitus type 2, cancer)
• Females > males
• Gait abnormalities
• Age > 80 years
• Age-related decline in response time during dual-tasking conditions with dynamic balance demands
• Environmental factors
  – Inadequate or excessive lighting
  – Slippery floor
  – Surfaces with glare or optical patterns
  – Inappropriate footwear
  – Area rugs, loose carpets/cords/wiring
  – Low toilet seats and seating surfaces
  – Fragile support structures (e.g., old furniture, loose towel bars)
  – Items on floor
  – Outdoor hazards – ice, wind, rain, fallen leaves, uneven pavement
• Demographic factors: housebound, lives alone
• Fear of falling (more common in females) associated with:
  – History of falling
  – Compromised balance and/or gait
  – Difficulty with instrumental activities of daily living (IADLs)
  – Compromised cognitive function
  – Pain
• Polypharmacy (≥ 4 medications)
  – Authors of an observational study of 262 outpatients in Japan (mean age 76.2 years) indicated that taking a mean of 4.0 prescription medications simultaneously was associated with a positive history of falls in the past year
  – Authors of the Irish Longitudinal Study on Ageing, a prospective, population-based cohort study involving 6,666 adults aged > 50 years, indicated that polypharmacy including antidepressants or benzodiazepine was associated with injurious falls and a greater number of falls
    – Participants reported regular medication use at baseline. Any falls, and whether they were injurious, were reported 2 years later. The associations between polypharmacy or fall-risk-increasing medications and falls were assessed with regression analysis
    – Polypharmacy including antidepressants was associated with injurious falls and greater number of falls, but antidepressant use without polypharmacy and polypharmacy without antidepressant use were not
    – Use of diazepines was associated with a greater number of falls independent of polypharmacy, but was associated with injurious falls when coupled with polypharmacy
  • Older women (ages 65–89) with type 2 diabetes, a low score on the Geriatric Depression Scale-15 (GDS-15) and the Timed Up and Go (TUG) test have a higher risk for falls, due to deficits in functional mobility, gait, and dynamic balance

**Overall Contraindications/Precautions**
› Obtain general mobility and weight-bearing restrictions from physician. Multiple precautions may be warranted depending on concomitant trauma and severity of injury
› In postoperative cases, obtain specific orders regarding activity/exercise from surgeon
Modify treatment to accommodate underlying diseases and conditions that may disturb balance (e.g., visual/hearing impairment, postural hypotension, hypoglycemia, head trauma, joint pain, cardiac insufficiency, hemiplegia, incontinence).

Use extreme caution with physical restraints (e.g., straps, belts) to prevent falls, and follow state laws and facility guidelines. Direct supervision is necessary when restraints are used.

See specific **Contraindications/precautions to examination** and **Contraindications/precautions** under **Assessment/Plan of Care**

## Examination

**Contraindications/precautions to examination**

- Stop the examination and refer to physician if patient presents with a new or untreated fall-related injury
- Consult with physician in cases of active inflammation or apparent infection of unhealed wounds
- Consult with physician in cases of severe disability requiring hands-on assistance
- Reduce the risk of a fall during assessment
  - Keep wheelchair or other moveable chair close to the patient to allow the patient to sit if necessary
  - Use gait belt as indicated to keep patient upright
    - If the patient sways too far to be kept upright, the gait belt can be used to gently guide him or her to the floor slowly to avoid injury
- Use good body mechanics to avoid injury to self
- Older adults with known risk factors for falls should be specifically questioned about falls on a periodic basis. Many older adults do not volunteer this information due to fears of being institutionalized or having activities restricted. These patients will not necessarily mention falling as a presenting complaint

## History

**History of present illness/injury**

- **Mechanism of injury or etiology of illness**
  - Explore the circumstances of recent fall(s)
    - Does the patient report a trip, loss of balance, fainting, functional impairment (e.g., “legs gave out”), or some other mechanism of falling? What direction was the fall?
      - Recurrent backward falls are associated with degenerative brain diseases
    - Symptoms preceding the fall
      - Any dizziness, light-headedness?
    - Activity at the time of the fall
      - Any assistive device being used?
        - Was patient hurrying or reaching for something?
    - Location of fall
      - Was the fall in familiar or unfamiliar surroundings?
        - Any environmental hazards (e.g., obstacles, slippery floor)?
          - The bathroom is the most common location of falls reported by older adults
    - Time of day of fall
      - If at night, were lights on?
    - Medications taken; any use of alcohol?
  - After the fall, was patient able to get up?
    - Did the patient lose consciousness? If so, for how long?
    - What injuries occurred at the time of the fall? Have the injuries healed?
  - Has the patient changed his or her lifestyle or discontinued any activities since the fall?
  - Was the fall witnessed? Any caregivers present?
  - Is there a history of previous falls or near falls? Identify factors (see Risk factors) that may have contributed to the fall. Document comorbidities that might contribute to falls (e.g., vestibular disorder, poor vision, peripheral neuropathy, multiple sclerosis, stroke). Any recent illnesses (e.g., respiratory or urinary tract infections)?

- **Course of treatment**
  - **Medical management:** What emergent care and follow-up care (medical/surgical) did the patient receive after falling? Any complications?
  - **Medications for current illness/injury:** Determine what medications clinician has prescribed; are they being taken?
Classes of medications associated with falls include tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), prescription analgesics, tranquilizers, antihypertensives, and various anti-arthritis drugs. Similar to TCAs and SSRIs, the newer dual-action serotonin-norepinephrine reuptake inhibitors (SNRIs) may increase the risk of falls in community-dwelling older persons.

Diagnosis completed: Usual tests for older adults with a history of falls include:

- Brain scans for TBI
- Magnetic resonance imaging (MRI) for soft-tissue damage
- Radiographic imaging for fracture
- Electrocardiogram (ECG) to screen for heart disease
- Ambulatory ECG monitor (if arrhythmias are suspected) and blood pressure monitoring (if low blood pressure is suspected)
- Tilt-table testing in patients with recurrent syncope/fainting
- Ultrasound bone scans
- Ophthalmology/audiology exam

Results of an Australian study investigating the prevalence of occult fractures in older patients presenting to an emergency department after a fall point to a need to incorporate other imaging (i.e., MRI, CT, bone scans) besides plain radiography into routine protocol to reduce the number of fractures not detected at initial presentation.

- One hundred ninety-one patients over the age of 70 years who presented with bone pain after a fall were included in the study.
- Half had no fracture identified clinically or on X-ray. Sixty of these were followed up 10 days after presenting to the emergency department.
- Four fractures were found on MRI and one on bone scan (incidence of missed fractures = 5.1%).
- Four of the fractures were vertebral and one was hip.
- The treatment of four out of five of these patients was changed as a result of the MRI or bone scan findings.
- Patients who sustained occult fractures reported more pain and lower quality of life compared to patients without fractures.

Home remedies/alternative therapies: Document any use of home remedies (e.g., ice or heating pack) or alternative therapies (e.g., acupuncture) for pain and whether or not they help.

Previous therapy: Document whether patient has had occupational or physical therapy for falls, near falls, balance problems, lower extremity weakness, joint pain, gait disturbances, and/or foot problems, and what specific treatments were helpful or not helpful. Has the patient had any previous education about fall prevention?

Aggravating/easing factors: Document factors and situations that increase the patient’s risk and fear of falling (e.g., urinary urgency, poor lighting, getting dressed/undressed, walking up or down stairs). Document factors that alter fall-related symptoms (e.g., vertigo, joint pain, faintness) such as position changes, head movement, or weight-bearing. It may be appropriate to ask the patient or caregiver whether lapses in judgment may be an aggravating factor.

Body chart: Use body chart to document location and nature of symptoms if applicable. Many relevant symptoms (e.g., fatigue, dizziness, reduced attention, psychomotor slowing) cannot be specifically located on a body chart.

Nature of symptoms: Document nature of symptoms associated with falls (e.g., knee pain, lightheadedness, drop foot, poor vision). Are symptoms constant or intermittent; generally increasing, decreasing, or staying the same? Describe nature of any pain (e.g., sharp or dull, aching, throbbing).

Rating of symptoms: Fear of falling may be assessed with the single question—“Are you afraid of falling?”—and a 4-category response scale (never, occasionally, often, very often).

The single-question approach is not associated with physical performance and is a poor predictor of future behavior. Standardized surveys to rate fear of falling may be more adequate. Examples include the Activities-specific Balance Confidence (ABC) Scale, the Survey of Activities and Fear of Falling in the Elderly (SAFE), and the Falls Efficacy Scale International (FES-I).

Use a visual analog scale (VAS) or 0–10 scale to assess pain associated with ambulatory activity.

Pattern of symptoms: Document when the patient feels unsteady (e.g., when rising from a chair, standing or walking, using stairs, changing directions, or reaching).

Sleep disturbance: Document number of wakings/night. Does patient complain of daytime fatigue? Does patient report taking medications to assist with falling asleep or staying asleep? Does the patient nap during the day? How frequently?
Other symptoms: Document other symptoms patient may be experiencing that could increase the risk of falls (e.g., mobility problems, continence problems)

Respiratory status: Does the patient use supplemental oxygen? Any history of shortness of breath? Chronic obstructive pulmonary disease (COPD)?

Barriers to learning
- Are there any barriers to learning? Yes__ No__
- If Yes, describe _________________________

Medical history

Past medical history
- Previous history of same/similar diagnosis: How many falls in the past year? Recurrent fallers are at higher risk\(^{(10)}\)
  - Obtain a description of the course of the problem over time. Various patterns (e.g., acute vs gradual onset) may suggest differing clusters of contributors\(^{(30)}\)
- Comorbid diagnoses: Ask patient about other medical problems (e.g., diabetes, cancer, cardiovascular disease, psychiatric disorders, orthopedic disorders, chronic kidney disease) and whether these reduce mobility
- Medications previously prescribed: Obtain a comprehensive list of medications prescribed and/or being taken (including over-the-counter drugs)
- Other symptoms: Ask patient about other symptoms he or she may be experiencing

Social/occupational history

Patient’s goals: Document what the patient hopes to accomplish with therapy

Vocation/avocation and associated repetitive behaviors, if any: (e.g., does the patient participate in recreational activities, games, or exercise groups that may increase risk of falling?)
- Risk patterns differ by overall mobility capacity. Active older adults may experience falls for different reasons than persons who cannot stand and walk\(^{(30)}\)
- In one study, fracture risk was reported to be higher in older persons with better balance, suggesting that activity increases the risk of producing sufficient force to fracture\(^{(30)}\)

Functional limitations/assistance with ADLs/adaptive equipment: Does patient modify activity or restrict/avoid activities because of fear of falling? What adaptive equipment does the patient use?

Living environment: Does the patient live alone? Has the patient modified his/her physical environment due to falling? Document stairs and number of floors in home. Does a caregiver provide assistance? Identify if there are barriers to independence in the home or if any modifications are necessary. Are there any pets in the home? See Maintenance and prevention, below, for more information about environmental modifications
- Some aspects of the patient’s adaptations may be explored through interview, but a home assessment may be necessary to obtain a complete picture

Relevant tests and measures (While tests and measures are listed in alphabetical order, sequencing should be appropriate to patient medical condition, functional status, and setting):

Anthropometric characteristics: Document patient’s height, weight, and body mass index (BMI)
- Obesity (BMI > 30) can increase risk of falls
  - In a study conducted in Australia, obesity was associated with a 25% higher risk of having fallen in the previous 12 months compared to non-obese individuals\(^{(54)}\)

Arousal, attention, cognition: Assess orientation x 4 (name, place, date, reason) and ability to follow instructions. Does patient demonstrate an obvious deficit in problem solving/executive function? Any apparent judgment problems?
- Cognitive function can be screened using the Mini-MentalState Examination (MMSE) as indicated

Assistive and adaptive devices: Assess need for an ambulatory or adaptive device. If such a device has been prescribed, is it appropriate (including fit) and being used correctly?
- For more information, see Clinical Review...Ambulatory Assistive Devices

Balance: Assess static and dynamic balance in sit and stand. Include at least one objective balance test, such as the Berg Balance Scale (BBS) or TUG, in the examination\(^{(72,74,75)}\)
- Two assessment tools used together would better evaluate the characteristics of falls in older adults since they tend to be multifactorial\(^{(75)}\)
- The BBS and TUG are generally used in community dwelling settings, and the Hendrich II Falls Risk Model and STRATIFY are more often used in hospital admissions\(^{(25)}\)
A score below 45 on the BBS (14 items, each scored on a 4-point scale) is associated with increased risk of falling (64). A change of 6.5 points between two BBS assessments was found necessary to achieve the 95% confidence level that a genuine change in balance function has occurred (14).

- Based on a study of 42 community-dwelling adults older than 65 years with a history of falls and an initial mean BBS of 39.

- Tandem test (i.e., stand toes of one foot to heel of the other foot) or semi-tandem test (i.e., stand with big toe of one foot touching the side of heel of the other foot) for 10 seconds.

- Posturography – quantification of postural sway in standing, usually using a force plate to record the excursions of the center of pressure.

- Romberg test – can detect visual dependence. Patient is asked to stand with feet together, first with eyes open, then with eyes closed.

- Tests whether proprioceptive and vestibular input is sufficient for patient to maintain balance when visual input is eliminated.

**Cardiorespiratory function and endurance:** If appropriate for patient’s functional status, administer 6-minutewalk for distance test (6MWT). The Borg Rating of Perceived Exertion (RPE) can be used in conjunction with the 6MWT.

- In an assisted living setting, fall risk was lower in older patients (72 to 96 years of age) who improved their walk distance on follow-up after exercise training for 12 months (15).

**Circulation:** Assess distal pulses in lower extremities. Assess blood pressure in supine, sit, and stand. Document symptoms of postural hypotension, such as lightheadedness, confusion, nausea, and fainting.

**Functional mobility** (including transfers, etc.): Assess safety, ability, and need for adaptive equipment in general mobility.

- In a study conducted in Brazil, the functional test that best discriminated older women with low vs. high concern about falls was the TUG test (25).

- One hundred thirty five older women (mean age 72.6 years) were divided into two groups based on their FES-I score: those with low concern (n = 56) and those with high concern (n = 79).

- Five functional tests were performed: TUG, 5TSTS, handgrip, unipedal stance, and gait velocity.

- The Short Physical Performance Battery (SPPB) is an objective assessment tool for evaluating lower extremity functioning in older adults developed by the National Institute on Aging (32).

- Provides information in three domains of lower-extremity function: gait speed, balance, and lower extremity strength and power.

- Has been shown to be predictive of short-term mortality and nursing home admissions in community-based older adults.

- Elderly Mobility Scale.

**Gait/locomotion:** Note preferred walking speed, step length, step symmetry, and gait abnormalities (e.g., limp, shuffle, contact between swing foot and stance foot).

- Observe for increased gait variability (stride-to-stride fluctuations in walking).

- Meta-analysis performed on ten good quality studies with a total of 999 cases and 4,502 controls showed that fear of falling is associated with a statistically significant increase in gait variability (26).

- A change of 2.9 points between two Dynamic Gait Index (DGI) assessments was found necessary to achieve the 95% confidence level that a genuine change in gait function has occurred (14).

- Based on a study of 42 community-dwelling adults older than 65 years with a history of falls and an initial mean DGI of 12.7.

- A score of 22 or less on the Functional Gait Assessment (ten items scored on a 0 to 3 scale, 30 points possible) has been determined to be an appropriate criterion score for clinicians to classify increased risk for falls in older adults and for predicting unexplained falls (16).

- Gait speed can be measured using the 10-meter walk test (10MWT).

- Gait speed has been shown to be a strong predictor of fracture incidence (38).

- Where available, spatiotemporal gait parameters can be measured with an electronic walkway.

- Assess for appropriateness and safety of ambulatory assistive devices used during gait assessment.

**Motor control assessment:** Assess as appropriate for patients with neurological disorders. Screen for motor control impairments that may be medication-induced, such as extrapyramidal symptoms (e.g., acute dyskinesias, dystonic reactions, tardive dyskinesia, parkinsonism, akinesia). Note presence of any spasticity, rigidity, or cogwheeling. Assess coordination of gross and fine motor skills as indicated.
• **Muscle strength**: Assess gross functional strength of upper and lower extremities, with special attention to quadriceps strength. Assess for weakness in the spinal extensors, which may cause forward lean and increase risk for falls.

  - **30-Second Chair Stand Test** – a functional measure of lower-body strength
    - Patient places hands on contralateral shoulders and rises from a straight-back chair without arm rests, then sits back down. The number of full rises in 30 seconds is counted, and scores are compared to normal values for gender and age. A below-average score indicates a high risk for falls.

  - Five Times Sit to Stand test (FTSTS) – a similar functional measure of lower-body strength. Time to rise five times is recorded.

  - Results of a systematic review suggest that in addition to muscle strength, muscle fatigue is a contributor to fall risk in older adults and is often overlooked.

  - Six studies that incorporated extrinsic measures of muscle fatigue, such as declines in maximal voluntary contraction or available active ROM, were included.

  - Muscle fatigue induces deteriorations in reactive postural control.

• **Observation/inspection/palpation**: Examine feet for deformities that could cause pain with weight-bearing/walking. Examine footwear for wear and appropriateness.

  - Foot problems in older adults, such as hallux valgus, callus, metatarsalgia, plantar fasciitis, swelling, deformed nails, and flattened arches, may affect biomechanics and increase fall risk.

• **Perception**: Screen for visual field and spatial relations problems in patients with history of stroke. (For more information, see Clinical Review...Stroke Rehabilitation: Unilateral Neglect) Visual-spatial attention may also be impaired in age-related neurological disorders associated with increased risk of falling, such as Alzheimer’s disease, leading to difficulty in planning and guiding movements.

• **Posture**: Assess posture in sitting and standing and for postural instability. Forward head position and thoracic kyphosis contribute to postural sway and increased reliance on hip strategies to maintain balance.

• **Range of motion**: Assess gross functional ROM and flexibility. Decreased ankle ROM (e.g., due to contracture or limited by ankle-foot orthosis) impairs the use of ankle strategy to maintain balance, increasing postural sway with greater reliance on hip strategies and trunk muscle strength.

• **Reflex testing**: Assess patella and Achilles tendon reflexes.

• **Self-care/activities of daily living (objective testing)**
  - Assess need for adaptive equipment (e.g., handrails, shower bench, raised toilet seat, cane, or walker) to complete ADLs and IADLs safely.

  - Assess patient’s confidence and fear of falling during ADLs with the ABC Scale, maximum score of 1,600 points.

• **Sensory testing**: Peripheral sensory testing is important since neuropathy is common in older adults. Altered proprioception and reduced sensation of the lower extremities can contribute to greater reliance on hip strategies to maintain balance.

  - Although proprioception is important for balance, testing for proprioception is not sensitive. Testing vibratory sense with a tuning fork over a bony prominence tests similar nerve fibers and is more sensitive.

  - A patient with impaired vision should be referred for an eye examination to assess for deficits in acuity, peripheral vision, and depth perception.

• **Special tests specific to diagnosis**
  - In community-dwelling older adults (62–95 years of age), choice stepping reaction time (stepping on targets that are randomly illuminated) has been shown effective for identifying recurrent fallers.

  - The Fall Risk Assessment & Screening Tool (FRAST) is a 15-item questionnaire (each item scored 0, 1, or 2) developed to assess fall risk in community-dwelling adults older than 65 years. Fear of falling may be assessed with the FES-I. Respondents rate their concern for falling (“not at all,” “somewhat,” “fairly,” or “very”) under conditions such as getting dressed or undressed, going up or down stairs, walking on a slippery surface, and walking up or down a slope.

### Assessment/Plan of Care

#### Contraindications/precautions

- Follow facility protocols for fall prevention and post fall-prevention instructions at bedside, if inpatient. Ensure that patient and family/caregivers are aware of the potential for falls and educated about fall-prevention strategies. Discharge criteria should include independence with fall-prevention strategies.
• Take special precautions to prevent falls while patient exercises, especially during functional training to improve posture, balance, and gait (e.g., use gait belt, parallel bars, or the assistance of another therapist when necessary).

• Caution is needed when recommending walking for community dwelling older adults, because walking can actually increase their risk of multiple or injurious falls.

– In a longitudinal study in Japan that examined the association between habitual walking and multiple or injurious falls, the incidence of falls was lower in walkers than non-walkers only in persons who had fewer than two risk factors for falls.

  - Risk factors identified:
    - Poor balance – < 10 second one-legged standing
    - Mobility limitation – reported difficulty with ten steps or 400 m without rest
    - Knee pain – reported or who had been treated for knee OA
    - Depressive symptoms – reported “I could not get going” or “everything is an effort” in last week
    - Assistive device – regularly used cane, walker or wheelchair
    - Polypharmacy – ≥ four meds
    - Previous fall history – fall in last year

• Evidence is lacking to support the use of physical or electrotherapeutic modalities for post-fall patient management. However, modalities may be indicated to treat injuries related to trauma associated with the current fall. Clinicians should follow the guidelines of their clinic/hospital and what is ordered by the patient’s physician.

• Consider use of protective equipment, such as hip pads, to prevent injury.

  Diagnoses/need for treatment: Post-fall/increased risk of falls due to age-related decline in physical functioning, including impaired lower-extremity strength, ROM, proprioception, and deficits in posture, balance, and gait.

  Rule out:
  - Elder abuse in case of documented non-accidental fall
  - Avoidable hazards in physical environment
  - Polypharmacy
  - Sleep disturbance
  - Dehydration
  - Seizure disorder
  - Heart rhythm or heart valve disorder
  - Anemia, infection, and metabolic problems

  Prognosis:
  - Falls can be fatal
    – Death rates from falls in older adults have risen sharply in the past decade.
    – Falls are the fifth leading cause of death in older adults.
  - Half of older adults who fall will have more than one fall.
    – Prognosis for recurrent fallers is poorer than for those who fall once
  - Fear of falling is predictive of participation restriction in both individuals with a history of falls and individuals with no history of falls
    – Rate of participation restriction is higher in those who are older, female, or inactive, and in those who have reduced functional performance, poorer health, decreased leg strength, social isolation, or a history of falls.
    – Fear-related participation restriction was found to be an independent predictor of declines in lower extremity, and functional performance and increased disability in community-dwelling older adults over a 3-year period.
    – Factors associated with fear of falling include inability to rise from chair of knee height, lower household income, use of an assistive walking device, difficulty using public transportation, poor physical health, self-reported balance problems, lower educational level, Black/minority ethnic group, and a higher BMI.
    – Immediate anxiety after a fall and persistent psychological problems may lead to post-traumatic stress disorder (PTSD) at 2 months, which may add to rehabilitation difficulties.

  Referral to other disciplines:
  - Since falling is a multifactorial problem, a multidisciplinary team is often involved. Disciplines may include:
    – Eye doctor for vision assessment and correction
    – Audiologist to address hearing impairments
- Psychiatrist to treat patients with severe anxiety/depression and/or fear of falling
- Community center for exercise-based programs
- Orthopedics/orthotist for postural bracing system, footwear
- Internist for assessment and treatment of vestibular disease
- Geriatrician for assessment and treatment of multiple health problems and chronic conditions in patients over age 65 years
- Neurologist for diagnosis and treatment of neurological disorders
- Social worker for placement issues, social environment issues
- Nurse
- Nutritionist
- Occupational therapist for home safety evaluation

Other considerations
- A home assessment for fall risk factors and the need for assistive/adaptive devices may be indicated in community-dwelling older patients
- Authors of a 2018 meta-analysis concluded that cognitive behavioral therapy (CBT) appears to be effective in reducing fear of falling and improving balance among older people (76)
  - Six trials involving 1,626 participants were analyzed
  - CBT interventions had significant immediate effects on reducing fear of falling that were retained for up to 12 months, and 6 months post-intervention effects on improving balance
- Gardening 1 or more hours per week is associated with reduced falls in adults aged 65 years and older (22)
  - Based on a comparison of falls over the past 2 years reported by 1,585 gardeners vs. 1,652 nongardeners
  - Gardeners had better scores on semi-tandem and tandem balance tests and faster preferred gait speed than the nongardeners

Treatment summary
- Authors of a 2017 meta-analysis concluded exercise alone and various combinations of interventions were associated with lower risk of injurious falls compared with usual care (22)
  - A total of 238 RCTs (159,910 participants) were included
  - The intervention most strongly associated with reduced falls seemed to be the combination of exercise and vision assessment and treatment
- High-quality evidence shows that multicomponent interventions can reduce risk of in-hospital falls by as much as 30% (41)
  - The optimal components have not been established
  - Common components include risk assessments, patient and staff education, bedside signs and wristband alerts, footwear advice, exercise, medication review, and scheduled and supervised toileting
- A fall prevention tool kit (FPTK) using health information technology was found effective in reducing falls at four urban U.S. hospitals in 2009 (19)
  - Existing communication and workflow patterns in the hospitals were integrated into the FPTK computer application. The FPTK software-tailored fall prevention interventions addressed each patient's specific determinants of fall risk after a valid fall-risk assessment scale was completed by a nurse
  - To alert key hospital units regarding patient-specific fall risk, the FPTK generated bed posters containing brief text with an accompanying icon, as well as patient education handouts and care plans
  - Patient fall rates were compared in 5,104 patients receiving usual care in four units vs. fall rates in 5,160 patients receiving the FPTK intervention in four units
    - The number of patients with falls during the 6-month intervention period was significantly less on the intervention units (n = 67) vs. the control units (n = 87; P = 0.02). The researchers estimated that use of the FPTK could prevent one in-hospital fall every 4 days, seven and a half falls per month, and approximately 90 falls annually
- Whether exercise training reduces the rate of falls in nursing care facilities remains uncertain (3)
- Authors of a 2018 meta-analysis to evaluate the effectiveness of exercise interventions on the rate of falls and number of fallers in care facilities found that exercise interventions including balance training (gait, balance, and functional training; or balance and strength) resulted in reduced rate of falls (78)
  - Twenty-one studies that included 5540 participants were reviewed
  - Meta-analysis showed that exercise had a preventative effect on the rate of falls and on the number of fallers. The effect was stronger when combined with other fall prevention interventions
  - Exercise interventions also resulted in reduced numbers of recurrent fallers
Authors of a systematic review and meta-analysis of the evidence for effective falls prevention interventions in older adults recently discharged from hospital found falls prevention exercise programs actually increased the numbers of falls, falls injuries, and proportions of fallers in this population\(^{79}\)

This is contrary to findings in community dwelling older adults that exercise programs that challenge balance are associated with reduction in falls.

Older adults recently discharged from hospital are generally functionally declined and so may have been unable to do the programs at the same parameters as the community dwelling older adults.

In particular the components of the home exercise program that may have contributed to the negative outcome include the lack of direct supervision, and recommended frequencies or 30–40 minutes at least 3–6 days per week. The authors suggested that more supervision and lower dosage of exercise might be required.

Strong evidence shows that structured fall-preventive programs for older adults, especially those in high-risk groups, are beneficial in reducing the number of fallers and the number of falls in community-dwelling older adults\(^{42}\)

The most effective strategies include regular physical training with a program that includes several different training modalities.

The United States Preventive Services Task Force (USPSTF) recommends exercise or physical therapy to prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls\(^{43}\)

USPSTF does not recommend automatically performing an in-depth multifactorial risk assessment in community-dwelling adults because the likelihood of benefit is small.

Effective exercise and physical therapy interventions include group classes and at-home physiotherapy strategies.

This review is an update to their 2010 systematic review and has a few notable differences. The updated findings do not support an association between vitamin D supplementation and reduced falls in the general population of older adults\(^{43}\).

The U.S. Department of Health and Human Services recommends for older adults at least 150 minutes per week of moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity, as well as muscle strengthening exercises twice per week and balance training 3 or more days per week.

The American Geriatric Society (AGS) recommends that exercise include balance, gait, and strength training.

Therapeutic exercises and functional training may be indicated to address impairments in lower extremity strength and ROM, as well as to reduce deficits in transfers, posture, balance, and gait\(^{2,8}\).

For information about using video gaming systems to promote exercise in older adults, see Clinical Review...Nintendo Wii Fit and Balance Training in Older Adults.

Balance-specific training in small groups of six or seven may decrease fear of falling in older adults in both the short-term and long-term.

Based on a randomized controlled trial (RCT) conducted in Sweden\(^{23}\).

The intervention (I) and control (C) groups consisted of 34 and 21 participants, respectively (mean age, 76 years).

I group did individualized exercises (supervised by two PTs) for 45 minutes that included progressive challenges to balance while sitting (on balls), standing, and walking, three times per week for 12 weeks, while C group continued their regular ADLs.

Outcome measures included gait function (preferred and fast walking), rapid step execution (single and dual task), fear of falling (FES-I), and likelihood of depression (Geriatric Depression Scale-20).

At 3-month follow-up, fear of falling assessed using the FES-I decreased significantly in the I group, with no change in the C group.

Walking ability and ability to rapidly execute a step during a cognitive dual task condition were also improved in the I group compared to the C group.

At 15-month follow-up, fear of falling remained significantly improved in the I group (n = 30)\(^{28}\).

Walking ability and dual task step execution were still improved in the I group at 9 months, but had returned to baseline by 15-month follow-up.

The gradual decrease in training effects indicates that periodic training sessions may help maintain long-term effects.

Aqua fitness may reduce fear of falling as measured by the FES-I in older adults with lower-extremity osteoarthritis who are physically inactive. Aqua fitness is a form of water-based exercise that typically includes aerobic endurance and resistance training in a vertical position in water that is at least waist deep\(^{59}\).

Based on an RCT conducted in New Zealand.

Thirty five participants were assigned either to an aqua fitness group or an active control group that performed exercises while seated in warm water.
Outcome measures included the TUG test, step test, sit-to-stand (STS) test, 400 m walk test, handgrip, and the FES-I.

After 12 weeks FES-I scores improved significantly in the aqua fitness group compared with the control group.

No significant change in TUG test, STS test, or handgrip strength was observed in either group. Both groups significantly improved in the 400 m walk test.

In a previous RCT, this group of researchers from New Zealand found that water-based exercise did not reduce risk of falling in older adults and concluded that it may not challenge balance responses sufficiently.

The intervention (I) and control (C) groups consisted of 23 and 16 participants, respectively (mean age, 74 years), with lower-extremity osteoarthritis.

I group did self-paced aquatic exercises that progressed from 20 to 60 minutes, two times per week for 12 weeks, while the C group took a time-matched computer skills program in sitting.

No significant differences between groups were found on follow-up for Physiological Profile Assessment, Step Test, TUG test, or ABC Scale.

As the level of fall risk increases, the exercise training strategy should be more individually tailored to target the patient’s specific impairments and functional deficits. Training should progress until fall risk is lessened.

Perturbation training, which involves unexpected external perturbations during walking that mimic environmental stumbles, is done to try to develop feedforward mechanisms of stability control, and to train the rapid reactions required after a slip or trip has begun.

Authors of a 2017 systematic review of perturbation training asked three separate review questions: Compared to standard falls prevention treatment, does perturbation training reduce community falls incidence in healthy older people who are fallers or at risk of falling; does perturbation training reduce laboratory falls in healthy older people who are fallers or at risk of falling; and does perturbation training reduce laboratory falls incidence in young healthy people?

Sixteen papers (849 participants) were included.

Results suggest that perturbation training may be effective compared to no treatment in reducing laboratory-induced falls in older and younger people; however, it is uncertain whether perturbation training reduces community falls incidence in frail older people.

Researchers who conducted an RCT found that incorporating perturbations during treadmill training improves balance during walking and improves voluntary stepping time and balance control in older adults.

Based on an RCT in Israel involving 53 community dwelling older adults (age 80 ± 5.6 years).

Patients were randomized to either the intervention group (n = 27) or control group (n = 26) and received 24 sessions twice a week for 12 weeks.

The intervention group ambulated on a treadmill for 20 minutes that included a 3 minute warm up. Patients were asked to walk at their preferred speed while receiving random perturbations from a therapist. Patients were not allowed to use the handrails, but were given a safety harness to prevent an accidental fall.

The control group ambulated on a treadmill for 20 minutes without any perturbations given.

Researchers who conducted an RCT found that virtual reality (VR) training combined with treadmill training can reduce the risk for falls in older patients.

Based on a multicenter RCT study that occurred at five clinical centers across five countries (Belgium, Israel, Italy, the Netherlands, and the UK) involving 302 older adults (ages 60–90).

Patients were randomized to either the treadmill training plus VR group (n = 154) or treadmill training only group (n = 148). Both groups trained 3x/week for 45 minutes for 6 weeks.

The VR system used a “motion-capture camera and a computer generated simulation” which simulates real-life challenges that patients may encounter, including obstacles, multiple pathways, and distracters.

Results gathered after 6 months show both groups having a decrease in the rate of falls; however, those in the treadmill training plus VR group had a significant reduction in falls compared to those in the treadmill training only group.

Authors of a 2017 systematic review and meta-analysis of literature investigating the effectiveness of virtual reality to improve mobility and balance in community dwelling older adults found the evidence inconclusive and further research warranted.

Twenty-eight studies with 1181 participants were appraised.

The review suggests there are positive clinical effects of virtual reality games for balance and mobility improvements compared with no-treatment and conventional interventions.

However, because there was a high risk of bias and large variability of intervention protocols, the evidence remains inconclusive.
Authors of a systematic review of RCTs investigating Tai Chi in older adults concluded that Tai Chi significantly reduced the number of fallers by 20%, and the rate of falls by 30%\(^\text{(20)}\)

- Eighteen RCTs with 3824 total participants were included.
- The preventive effect of Tai Chi appears to increase with exercise frequency.

Authors of a meta-analysis on the effects of Pilates on balance and falls in older adults concluded that Pilates improves balance, both static and dynamic, and might also reduce falls\(^\text{(82)}\)

- Fifteen RCTs were included.
- The results also suggested that Pilates may produce greater effects in balance than other training approaches for balance.
- They found the literature too scarce to draw definitive conclusions about whether Pilates reduces falls in older adults.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Goal</th>
<th>Intervention</th>
<th>Expected Progression</th>
<th>Home Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower extremity muscle weakness</td>
<td>Functional strength</td>
<td><strong>Therapeutic exercises</strong></td>
<td></td>
<td>Community-/home-based exercise program</td>
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<td></td>
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<td>General strengthening exercises</td>
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<td></td>
<td></td>
<td>Focus on quadriceps and spinal extension exercises (weakness in these muscles contributes to falls)</td>
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<tr>
<td>Decreased lower extremity ROM/flexibility</td>
<td>Functional ROM/flexibility</td>
<td><strong>Therapeutic exercises</strong></td>
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<tr>
<td></td>
<td></td>
<td>Address specific impairments, especially hamstring and Achilles tendon ROM restrictions</td>
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<tr>
<td>Limited endurance</td>
<td>Improve functional endurance</td>
<td><strong>Therapeutic exercises</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>General aerobic endurance activities</td>
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<tr>
<td>Postural deficits</td>
<td>Correction of faulty posture</td>
<td><strong>Assistive devices</strong></td>
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<td></td>
<td>Thoracolumbar, lumbosacral supports</td>
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<td></td>
<td></td>
<td><strong>Therapeutic exercises</strong></td>
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<tr>
<td></td>
<td></td>
<td>Postural correction exercises</td>
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<tr>
<td>Posture, balance, and gait deficits</td>
<td>Protective dynamic balance and gait stability</td>
<td>Gait training</td>
<td>Balance training</td>
<td>If safe, prescribe home exercise program incorporating balance activities</td>
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<tr>
<td>Improve scores on standard balance tests</td>
<td>Address specific deficits (e.g., decreased weight shifting, decreased heel-toe progression) and provide assistive devices if needed</td>
<td>Provide assistive devices</td>
<td>Tai chi (20)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Balance training</td>
<td>Static and dynamic balance exercises</td>
<td>Pilates exercises (50, 82)</td>
<td>Virtual reality exergaming (81)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restrictions in daily activities</th>
<th>Improve safety at home and in community</th>
<th>ADL training</th>
<th>Progress towards patient safely completing ADLs</th>
<th>If safe, prescribe home exercise program incorporating functional activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve safety in ADLs</td>
<td>Functional exercises (e.g., reaching, step up, step down, sit to stand), provide equipment as appropriate (e.g., reachers, shower chair), refer to occupational therapy</td>
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</table>

<table>
<thead>
<tr>
<th>At risk for recurrent falls</th>
<th>Reduce incidence of falls</th>
<th>Assistive and adaptive devices</th>
<th>N/A</th>
<th>Implement home modifications, educate family/caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provide necessary adaptive equipment and remove environmental hazards</td>
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**Desired Outcomes/Outcome Measures**

- Desired outcomes/Outcome measures
  - Functional lower-extremity muscle strength and endurance
    - MMT, 30-second chair test, 5 time sit to stand test
  - Functional lower-extremity ROM/flexibility
    - Goniometry
  - Improved dynamic balance
    - BBS, TUG test, Tinetti Test, Functional Reach Test
  - Improved functional mobility/gait
    - Short Physical Performance Battery (SPPB), Functional Gait Assessment, DGI, 30-Second Chair to Stand Test, FTSTS
  - Improved walking endurance
    - 6MWT, Borg RPE
  - Reduced fear of falling/increased confidence in balance
• Decrease fall occurrences

Accurately ascertaining falls in older adults can be complicated by problems with recall and reporting biases. Authors of a study in the United States suggest that an individualized calendar with journal pages to be completed daily and submitted monthly is an effective tool to improve the accuracy of this outcome measure for therapy intervention. Incentives to submit monthly reports can improve the compliance rate. A 99.1% compliance rate over 12 months (1,487 out of 1,500 calendar months) was obtained when participants received a gift card as incentive.

Maintenance or Prevention

› Refer to physician for medication review if patient is taking benzodiazepines, antidepressants, anticonvulsants, diuretics, or other medications that may cause dizziness or postural hypotension. Refer to physician if vestibular disorders are suspected.

› Self-efficacy in falls prevention was found to be independently associated with balance and mobility and with quality of life in community-dwelling women over 65 years of age.

› Older community-dwelling persons might not find fall-prevention messages relevant, in part due to a tendency to underestimate their own chances of falling.

› Based on a population-based survey conducted in Australia, 389 community-dwelling individuals aged ≥ 65 years completed a computer-assisted telephone interview about their fall history, their perceived chance of falling, and their rating of other persons’ chances of falling. Respondents were comparatively optimistic about falling, rating other persons’ chances of falling in the next 12 months as being greater than their own chance. Those who had fallen in the last 12 months were less comparatively optimistic. These results suggest that fall prevention risk-reduction messages may not be successful in engaging older persons because older persons may not believe they are relevant to them.

› Older persons who have fallen may be more open to receiving information about falls. It seems the opportune time to provide fall prevention information is when older persons present with a fall or when fall screening indicates a history of falls within the past 12 months.

› Osteoporosis prevention to reduce fracture risk

• Lifestyle modification; exercise, diet, etc.

• Weight-bearing exercise

• Smoking cessation

› Patient education to discourage use of step stools or other high-fall-risk activities, such as walking on ice or other slippery surfaces.

› Home modifications

• Make necessary adjustments for low light or glare
  – Ensure light switches are safely accessible
  – Timers may be used so that lights turn on at dusk
  – “Clapper” device may be useful
  – Ensure nightlights are bright enough to provide adequate lighting
  – Motion-activated lighting

• Remove or tack down loose carpet

• Ensure walkways are unobstructed

• Encourage use of chairs with armrests that are at an adequate height for safe sit-to-stand transfer.

• Falls occur frequently on stairs; ensure handrails are present and secure. Contrast tape in bright colors can be used to highlight steps, and nonskid strips can be applied to each step.
  – If unable to make stair climbing safe, other options include installation of chair lifts and rearrangement of rooms to allow single-floor living.

• Grab bars, raised toilet seat, tub seat, shower chair, and nonskid mats in the bathroom may reduce falls.

• Other necessary modifications may include widening of walkways and doorways and rearranging furniture to accommodate walkers or wheelchairs.

• For more information on home modifications, see Clinical Review…Home Modifications (Occupational Therapy).

› Prevention of falls and fractures in hospitals and nursing homes.
• Most evidence on successful strategies to prevent falls is derived from older adults in the community. This evidence may not apply to patients in hospitals or nursing homes who are medically unstable and/or cognitively impaired. A systematic review of multiple study types showed that multifaceted interventions may reduce the number of falls in hospitals and nursing homes. The interventions that were reviewed included risk assessment, care planning, medical/diagnostic approaches, changes in the physical environment, education programs, medication review, hip protectors, removal of physical restraints, and exercise. 

– It is unclear whether fall rate is associated with floor covering (i.e., carpeted or uncarpeted floors)
– Use of hip protectors in nursing homes may reduce rates of hip fracture and may reduce fear of falling
– Exercise as part of the multifaceted intervention helps to prevent falls
– Removal of physical restraints had no significant effect on falls or fractures

A collaborative interdisciplinary falls service in the United Kingdom was found to reduce the conveyance to hospital of older persons who experience falls, was perceived as valuable and helpful by the patients, and showed potential cost savings for health care.

• Health and social care professionals were specifically trained to focus on assessment and intervention issues immediately post fall and in the first 72 hours
• The authors concluded that having an understanding of falls and the circumstances leading to them facilitated a better (i.e., targeted and proactive) response

Patient Education

• Mayo Clinic website, “Simple steps to prevent falls”
  https://www.mayoclinic.org/healthy-lifestyle/healthy-aging/in-depth/fall-prevention/art-20047358
• Brochures from CDC for patients:
  • https://www.cdc.gov/homeandrecreationalsafety/pdf/falls/WhatYouCanDoToPreventFalls8.5x11.pdf

Coding Matrix

<table>
<thead>
<tr>
<th>Coding Letter</th>
<th>Description</th>
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<tbody>
<tr>
<td>M</td>
<td>Published meta-analysis</td>
</tr>
<tr>
<td>SR</td>
<td>Published systematic or integrative literature review</td>
</tr>
<tr>
<td>RCT</td>
<td>Published review (randomized controlled trial)</td>
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<tr>
<td>R</td>
<td>Published review (not randomized controlled trial)</td>
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<tr>
<td>C</td>
<td>Case histories, case studies</td>
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<tr>
<td>G</td>
<td>Published guidelines</td>
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<tr>
<td>RV</td>
<td>Published review of the literature</td>
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<td>RU</td>
<td>Published research utilization report</td>
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<td>GI</td>
<td>Published quality improvement report</td>
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<td>L</td>
<td>Legislation</td>
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<td>PGR</td>
<td>Published government report</td>
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<td>Published funded report</td>
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<td>PP</td>
<td>Policies, procedures, protocols</td>
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<tr>
<td>X</td>
<td>Practice exemplars, stories, opinions</td>
</tr>
<tr>
<td>GI</td>
<td>General or background information/texts/reports</td>
</tr>
<tr>
<td>U</td>
<td>Unpublished research, reviews, poster presentations or other such materials</td>
</tr>
<tr>
<td>CP</td>
<td>Conference proceedings, abstracts, presentation</td>
</tr>
</tbody>
</table>

References

9. Fillatrat J, Desrosiers J. Coping strategies used by seniors going through the normal aging process; does fear of falling matter?. Gerontology. 2011;57(3):228-236. (R)


