

Strategies to Reduce Risk of Hip Fracture

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The prevalence of hip fractures is a serious concern to both the residents and the interdisciplinary staff of assisted living (AL) facilities. According to the American Academy of Orthopedic Surgeons, more than 350,000 hospital admissions and 60,000 nursing home admissions annually are due to hip fractures.¹ Moreover, the incidence of hip fracture is expected to rise to an estimated 650,000 annually by the year 2050 because of the increasing age of the US population. Women account for approximately 80% of all hip fractures. However, despite gender, the rate increases exponentially with age. Compared with their younger counterparts ages 60 to 65, people 85 years and older are 10 to 15 times more likely to sustain a hip fracture.

The prognosis for older adults after a hip fracture is grim. More than 28% die within the first year. Fifty percent lose the ability to walk independently, resulting in the need for an assistive device for safe mobility. Loss of functional independence can be life altering. There is often an increased reliance on caregivers, which may necessitate altered living arrangements. Long-term care (LTC) admissions account for 40% of sustained hip fractures.

Successful resident retention requires an effective approach that is both multifaceted and individualized to minimize the incidence of hip fractures. Strategies include reduction of fall risk factors, prevention and management of osteoporosis, and encouragement of consistent exercise at therapeutic levels.



Fall Prevention

The risk for hip fractures can be reduced by preventing falls. In the AL and LTC settings, a fall prevention and management program is paramount. In June 2007, The Joint Commission released the 2008 *National Patient Safety Goals for Assisted Living Facilities*, which included (1) “reduce the risk of resident harm resulting from falls” and (2) “implement a fall reduction program including an evaluation of the effectiveness of the program.”²

To be effective, a fall prevention program must be comprehensive. The first step requires identification of the environmental and individual fall risk factors of each resident. Once risk factors are identified, an action plan can be implemented to reduce the risk of falls and reduce the potential for hip fractures. However, initial reduction of risk

factors is not enough. Investigation of the circumstances after the occurrence of a fall and the resulting interventions are also essential components of a fall management program. Therefore, it is vital to perform regular analysis and program modification to effectively impact fall statistics. Utilization of all members of the interdisciplinary medical team and facility staff is required for effective and thorough management of the multifaceted aspects of fall prevention.

Extrinsic fall risk factors in the facility environment that are easily resolved may include clutter or obstacles in the hallways; waxed, wet, or slippery floors; and excessive furniture in the common areas that limit space for a clear path to ambulate. In the resident’s room, inappropriate bed and chair heights, excessive clutter, throw rugs, and limited walk-

ing space are common contributing factors to falls. Poor or inadequate lighting, particularly lack of night-lights in the bedroom and bathroom is another significant environmental fall risk factor. All staff, including housekeeping and direct caregivers, should be educated about how to identify and resolve environmental risk factors for falls. Assessment of the facility and resident rooms should be a frequent and consistent part of the fall prevention program.

Another considerable extrinsic fall risk factor is polypharmacy. The daily use of 4 or more medications doubles a resident's risk for falls. Additionally, commonly used medications can increase the risk of falling by causing dizziness and drowsiness. The physician, nursing staff, and consultant pharmacist should regularly perform a review of medications to rule out potential side effects and negative interactions.

Each resident should be thoroughly screened for intrinsic fall risk factors. To maintain proper posture and balance, many systems must be working. A change in medical status or progression of chronic diseases, including neurological, musculoskeletal, and cardiovascular conditions, should be addressed by a physician and monitored by the nursing staff. Yearly eye examinations are important to screen for visual deficits such as diminished depth perception and visual field limitations, which may limit safe mobility.

Physical therapists can perform a complete strength, balance, and gait evaluation to assess safety and fall risk during daily activities. The physical therapist may identify a need for an assistive device or further training on the appropriate and proper use of the current assistive device for safe ambulation. Physical therapists are also skilled in the treatment of gait and balance disorders.

Occupational therapists are consulted for training in functional activities of daily living (ADLs) to maximize safety and independence with dressing, toileting, and transferring

One- or Two-Sided Hip Protectors?

Research continues on the use of one- or two-sided hip protectors.

Kannus and colleagues¹ found that the risk of hip fracture can be reduced in frail elderly adults by the use of an anatomically designed bilateral external hip protector. The study included 1801 ambulatory but frail elderly adults (mean age 82 years). In the hip-protector group, 4 people had a hip fracture (among 1034 falls) compared with 9 control patients (among 370 falls).

Kiel and colleagues² more recently reported results of the HIP PRO study, designed to determine efficacy of an energy-absorbing and energy-dispersing unilateral hip protector in 1042 elderly nursing home patients (mean age 85 years; 79% women) to reduce the risk of falls. Residents were randomly assigned to a 1-sided hip protector on the left or right hip. The study was terminated at 20 months for failure to show efficacy of the hip protector despite good adherence to the treatment. The efficacy of bilateral versus unilateral hip protectors is still being researched.

Reference

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2. Kiel DP, Magaziner J, Zimmerman S, Ball L, Barton BA, Brown KM, Stone JP, Dewkett D, Birge SJ. Efficacy of a hip protector to prevent hip fracture in nursing home residents. The HIP PRO randomized controlled trial. *JAMA*. 2007;298:413-422.

in and out of the bathtub. In addition, an occupational therapist assesses residents' needs for adaptive equipment such as an elevated toilet seat, tub bench, or grab bars. Direct caregivers should be knowledgeable about proper footwear that is appropriate for each resident, including shoes with nonskid soles and clothing that fits properly and is easy to take on and off for toileting.

According to a study by Kannus and colleagues in the *New England Journal of Medicine*,³ the risk of hip fracture can be reduced in frail elderly adults by the use of an anatomically designed external hip protector. The FDA has approved hip protector garments for the use of reducing hip fractures. Hip protectors are worn over undergarments but under clothing and are readily available through a medical supply company (see also *One- or Two-sided Hip Protectors?*).

Osteoporosis Prevention and Management

Osteoporosis is a skeletal disease characterized by a decrease in bone mass that causes increased bone

fragility and fracture risk. Osteoporosis is referred to as a silent disease because symptoms are often absent until a fracture occurs. Women account for 80% of the 25 million Americans who have reached the defined threshold for osteoporosis. Millions more suffer from osteopenia, a precursor to osteoporosis.

Type I osteoporosis primarily affects women 10 to 15 years postmenopause, with the greatest loss of bone mass in the initial 5 years. Fracture risk is highest in the wrist and the vertebral bodies. Type II osteoporosis is referred to as age-related or senile osteoporosis because it affects both men and women with onset after age 70. It is caused by a decrease in calcium absorption and production of active vitamin D. Type II osteoporosis affects both trabecular and cortical bone, resulting in an increased risk for fractures of the hip and the vertebral bodies.

Identification of those residents at risk for or diagnosed with osteoporosis is a good step in identifying those who are more likely to have a hip fracture. Screening for osteoporosis includes identification of

primary risk factors including age, female gender, small bone structure, and low body weight (less than 127 lb), sedentary lifestyle, smoking, poor diet, and use of certain medications. Medications used to treat rheumatoid arthritis, depression, seizure disorders, and disorders of the endocrine and gastrointestinal systems may have side effects that can damage bone and lead to osteoporosis. It is also important to consider that certain medications such as glucocorticoids, loop diuretics, and antiseizure medications can reduce the amount of calcium in the bone. Diagnosis of osteopenia and osteoporosis is confirmed with bone mineral densitometry (BMD) tests such as dual-photon absorptiometry (DPA) and dual-energy radiograph absorptiometry (DEXA).

Preventative strategies to manage osteoporosis should include education about proper diet, lifestyle modification, and the impact of smoking and excessive alcohol use on bone health.

The typical diet of elderly Americans is deficient in calcium and vitamin D, which are necessary for bone health. The recommended intake of 1500 mg or more of calcium and 400 IU/day or more of vitamin D can reduce fracture risk by up to 30% in some populations. The healthcare team members can work together to develop a diet that meets the requirements. In addition to calcium and vitamin D, pharmaceutical agents such as bisphosphonates and calcitonin can assist in bone resorption.

Hip fractures related to osteoporosis can occur because of the extent of bone fragility combined with poor body mechanics during ADLs. People at risk for osteoporotic hip fractures should be educated about posture and proper body mechanics to avoid excessive strain.

Physical activity is required to maintain proper bone development and growth. Declining activity level has direct consequences on bone stability. A sedentary lifestyle increases the risk of osteoporosis and hip fracture. The most extreme ex-

ample of this is bedrest, which causes a 1% loss of bone mass per week. It is important to realize that basic ADLs do not prevent or manage osteoporosis. Consistent weight-bearing exercise, such as standing or walking, is required to prevent bone loss in the lower extremities.

Therapeutic Exercise

The benefits of exercise are well documented in the research literature. For exercise to be effective in improving bone density, muscle strength, and balance, the appropriate type, intensity, frequency, and duration must be performed. The Centers for Disease Control and Prevention (CDC) recommends that adults should engage in 30 minutes or more of moderate-intensity physical activity on most, if not all, days of the week.⁴

Declining physical activity level has direct consequences on bone stability.

Resistance exercises use weights or exercise bands for resistance and are essential for increasing bone and muscle strength. Research continues to demonstrate its effectiveness in the elderly population. Numerous research studies have also demonstrated the positive impact of balance exercise training on reducing the risk of falls. Tai Chi is one popular type of low-intensity weight-bearing, dynamic-balance exercise program that has been shown to directly impact fall statistics in older adults.

Physical and occupational therapists can work with other members of the interdisciplinary team to develop and implement an individualized exercise program for at-risk residents to improve bone density, strength, flexibility, and balance for hip-fracture reduction.

In addition, a group exercise

class can offer companionship and motivation for a consistent flexibility and strengthening program. With the same focus in mind, walking programs are becoming more prevalent in residential and community living. Despite the exercise program chosen, to effectively reduce falls and hip fractures, consistent weight-bearing and moderate-intensity exercise is required.

Final Thoughts

The most effective approach to lessening the incidence of hip fracture is multifaceted and individualized. Strategies to reduce the risk of hip fracture include reduction of fall risk factors, prevention and management of osteoporosis, and encouragement of a consistent exercise program at therapeutic levels. An approach that includes all members of the interdisciplinary medical team and facility staff members is an effective and thorough way to manage the multifaceted aspects of hip fracture prevention. ALC

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