



## Why Do We FALL?

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Every year more than two million Americans fall and sustain serious injury, costing in excess of \$3 billion. Falls and the resulting injuries have become one of the elderly's most serious health issues.

### Causes

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The accumulation of injuries and illnesses throughout our life can damage the central nervous system (CNS) and the body as a whole, and our bodies deteriorate through inactivity. Vision diminishes as we age and this directly affects the sensory systems in our body which controls movement. The sensory cells in the ear's balance system change. They gradually decrease and cannot be replaced. The activity of nerves that carry sensory information to the brain also diminishes with age. Complex brain interconnections lose connecting fibers and nerve cells. The ability of nerve endings to generate the chemicals responsible for the transmission of information also seems to be affected by aging. These deteriorations accelerate after the age of 50.

Injuries to the knees, hips and back often do not completely heal, leaving some limitation of motion. Arthritis can cause permanent, crippling, irreversible effects. Osteoporosis leads to bone weakness and increases the probability of serious injury from a fall, or might cause a spontaneous fracture and lead to a fall. Muscle strength gradually decreases with age. Joint tendons and ligaments lose their flexibility and limit motion.

Many diseases affect the CNS and sense organs. Hardening of the arteries (atherosclerosis) is probably the worst; it is accelerated by high blood pressure, smoking, and diabetes. Although it gradually increases during middle age, sometimes there is a point at which a slight decrease in blood flow causes serious vascular impairment such as a stroke.

Head injuries, sometimes caused by falls, can damage the sense organs in the inner ears or the brain itself. The worst disability occurs when both sense organs and CNS structures are damaged simultaneously. Physical activity is very important for recovery from injury to the sensory systems. Recovery is compromised when there is a decreased level of activity. Central

degenerative disorders, such as Alzheimer's disease, can severely affect higher nervous system function.

Disease of the eyes, such as glaucoma and cataracts, decrease visual sensory function and are a common problem in old age.

The combined ravages of bone and joint injury, arthritis and inactivity can result in a body that cannot carry out motion commands initiated by the brain.

## Prevention

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Many of these problems that are responsible for us falling can begin to develop during early and middle age due to our lifestyle. Initial efforts to prevent injuries must be aimed at younger age groups. Many of the changes in muscle, bone and the central nervous system are not only cause by aging, but are brought on by inactive lifestyles and self-inflicted damage from smoking, poor diet, physical injury and lack of exercise. Although hardening of the arteries is occasionally hereditary, in most cases it can be reduced by diets low in cholesterol and saturated fatty acids, as well as regular physical exercise. This stimulates the muscles as well as the cardiovascular system and could greatly reduce this problem. If there is a family history of hardening of the arteries; medications are available to lower blood lipids and cholesterol. Early diagnosis and treatment of diabetes and hypertension can lower the risk of atherosclerosis (hardening of the arteries).

Many of the medications used to treat hypertension, heart disease, allergy, insomnia, stomach acidity, and depression have side effects which influence brain function and can increase the likelihood of falling. Combination of medications can have additive side effects on the brain and sensory functions. Patients should keep a complete list of all their medications and dosages, and make this list available to each physician they consult.

Coordination of all medications through a single primary care physician helps avoid adverse drug reactions. Many pharmacies use computer systems to warn the pharmacist about potential drug interactions. This requires that the patient purchase all medications from the same pharmacy or list all medications with each pharmacy. Unfortunately, some over-the-counter medications such as antihistamines, sleeping medications, pain relievers, and cough suppressants can add to the side effects of prescription medications including brain and sensory functions. Alcohol also affects movement and judgment and severely interacts with many prescription and over-the-counter medications.

# Prevention Tips

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## Health

- ◆ **Have your vision and hearing checked regularly.**  
If your vision and hearing are impaired, you may lose important signals that help you maintain your balance.
- ◆ **Get up slowly.**  
A momentary drop in blood pressure, due to medications or aging, can cause dizziness if you stand up too quickly.
- ◆ **Maintain balance and footing.**  
If you sometimes feel dizzy, use a cane or walker to help you to keep your balance on uneven ground or slippery surfaces. Wear sturdy, low-heeled shoes with wide, nonskid soles.
- ◆ **Exercise regularly.**  
Regular exercise improves your strength, muscle tone and coordination. This can not only help prevent falls, it can reduce the severity of injury if you do fall. Walking is a good form of exercise.

## Home

- ◆ **Remove raised doorway thresholds in all rooms.**  
Rearrange furniture, if necessary, to keep electrical cords and furniture out of walking paths. Fasten area carpets to the floor with tape or tacks, and don't use throw rugs.
- ◆ **Don't use difficult-to-reach shelves.**  
Never stand on a chair. Use nonskid floor wax and wipe up spills immediately.
- ◆ **Be sure stairways are well lighted and have sturdy hand rails.**  
If you have a vision problem, apply brightly colored tape to the first and last steps.
- ◆ **Install grab handles and nonskid mats inside and just outside your shower and tub, and near the toilet.**  
Shower chairs and bath benches minimize the risk of falling.

- ♦ Put a light switch by the bedroom door and by your bed so you don't have to walk across the room to turn on a light.  
Night lights in your bedrooms, halls, and bathrooms are a good idea.

## Rehabilitation

What about patients who have already fallen? Although rehabilitation is not perfect, much can be done. The first task is a thorough and complete evaluation of the patient's sensory, CNS and muscle/joint function. A careful evaluation of the balance function should be performed. This includes a search for causes of dizziness, such as inner ear diseases that cause imbalance, an evaluation of the inner ear balance system which might be adversely affected by certain drugs (such as a class of antibiotics known as aminoglycosides), trauma, and the aging process.

Tests of higher mental function are important since falling may be a sign of mental deterioration. A careful review of all medications (both prescription and over-the-counter) used by the patient is very important. If the patient needs medication for anxiety or depression, switching from a long-acting drug to one that is more quickly passed from the body seems to decrease the risk of falling.

All correctable problems should be treated. Visual correction with proper eyeglasses, improvement of hearing by hearing aids, adjustment or elimination of medication, and correction of high blood pressure or any other disease which could impair balance must be accomplished.

Rehabilitation includes increasing the range of motion as well as physical strength. A very important part of rehabilitation is helping patients overcome their fear of falling and to prevent further injury.

Walkers and canes can help with stability. Simple changes such as installing hand holds in bathrooms or along walls and rearranging furniture could decrease the likelihood of falling and increase patient confidence.

Removing the patient from a familiar environment, or drastically changing it, often slows recovery. As soon as possible, rehabilitation should be moved to an outpatient setting with participation of family members and home support groups. Rapid return to physical activity and social interaction with family and community can often improve a person's mental and physical health.