VESTIBULAR DISORDERS ASSOCIATION

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Balance and Aging

By Charlotte Shupert, PhD, with contributions by Fay Horak, PhD, PT Oregon Health & Science University, Portland, Oregon

One of the leading health concerns for people over the age of 60 is falling, which is often related to balance problems. Each year, between 20 and 40 percent of adults over 65 who live at home fall. The consequences of falls can be disastrous; between 12 and 67 percent of elderly adults who fracture a hip die within one year. As a result, major scientific efforts are devoted to determining the causes of falling in older adults in an attempt to reduce this significant health hazard.

Causes of imbalance in older people

Balance in walking and standing is dependent on many factors. Good balance requires reliable sensory input from the individual's vision, vestibular system (the balance system of the inner ear), and proprioceptors (sensors of position and movement in the feet and legs). The elderly are prone to a variety of diseases that affect these systems, including cataracts, glaucoma, diabetic retinopathy, and macular degeneration, which all affect vision; diabetic peripheral neuropathy, which affects position sense in the feet and legs; and degeneration of the vestibular system.

Balance is also dependent on good muscle strength and joint mobility. A sedentary lifestyle and arthritis or diseases of bones and muscles can compromise strength and mobility.

Because balance is a complex function, there is often no single identifiable cause of falls in an elderly person. However, older people with chronic dizziness or imbalance are two to three times more likely to fall in comparison with older people who do not experience these problems.[1]

Symptoms of a sense of lightheadedness or disorientation (dizziness) and/or a mild to violent spinning sensation (vertigo) can have a variety of causes: vestibular (inner ear) disorders, central nervous system disorders (such as stroke), cardiac problems (including low or high blood pressure), low blood sugar, infection, hyper-ventilation associated with anxiety attacks, medication side effects or interactions between drugs, or an inadequate or poorly balanced diet. A thorough evaluation by a physician is usually necessary to help sort out these different possible causes and arrive at a correct diagnosis. This task can be even more complicated when multiple problems are present. In such cases, the trouble in any one system may not be severe, but the combined effects may be enough to cause a serious problem with

balance. For example, an elderly individual with arthritis in the ankle joints and a mild degeneration in vestibular function may be able to balance adequately until under-going an operation to remove cataracts. The disturbance in vision during the healing process and the adjustment to the new glasses or contacts may then be sufficient to result in imbalance and falls.

The aging vestibular system

Most people are familiar with the problems associated with the aging of senses such as vision and hearing. However, the vestibular system is another sensory system that can also begin to function poorly with age, leading to a diminished quality of life.

The vestibular system is a complex structure of fluid-filled tubes and chambers that constitutes part of the inner ear. Specialized nerve endings inside these structures detect the position and movement of the head and also detect the direction of gravity. The signals sent from the nerves of the vestibular system are critically important to the brain's ability to control balance in standing and walking and also to control certain types of reflexive eye movements that make it possible to see clearly while walking or running.

Anatomical studies have shown that the number of nerve cells in the vestibular system decreases from about age 55. Blood flow to the inner ear also decreases with age. Idiopathic bilateral (occurring on both sides) vestibular loss becomes more severe as age progresses. When the vestibular system is damaged by any cause, an individual may experience dizziness and balance problems. However, the gradual, age-related loss of vestibular nerve endings can result in severe balance problems without any associated dizziness. This type of slow loss of vestibular function may be first noticed as difficulty walking or standing, especially in the dark while on soft or uneven surfaces (such as thick carpet or a forest path).

Specific vestibular disorders in older adults

Of all vestibular disorders, *benign paroxysmal positional vertigo* (BPPV) is one of the most common in older adults. BPPV causes vertigo, dizziness, and other symptoms due to debris that has collected within a part of the inner ear. This debris, called *otoconia,* is made up of small crystals of calcium carbonate (sometimes referred to colloquially as "ear rocks"). With head movement, the displaced otoconia shift, sending false signals to the brain and causing dizziness or vertigo.

Symptoms of BPPV are almost always precipitated by a change in head position. Getting out of bed and rolling over in bed are two common "problem" motions. Some people feel dizzy and unsteady when they tip their heads back to look up.

Ménière's disease is another vestibular disorder that causes dizziness. Ménière's disease produces a recurring set of symptoms as a result of abnormally large amounts of a fluid called *endolymph* collecting in the inner ear. These symptoms typically include spontaneous, violent vertigo, fluctuating hearing loss, ear fullness, and/or tinnitus.

The incidence of Ménière's disease (number of new cases per year) is difficult to assess. Estimates vary widely, in part because of the variability in diagnostic criteria across studies. The prevalence, however (all cases within a population), is generally known to increase with age.

Other vestibular disorders that may occur in older adults include *vestibular neuritis* (inflammation of the vestibular branch of the vestibulo-cochlear nerve, resulting in dizziness or vertigo but no change in hearing) and *ototoxicity* (exposure to certain chemicals that damage the inner ear or the vestibulo-cochlear nerve, which sends balance and hearing information from the inner ear to the brain). Ototoxicity can result in temporary or permanent disturbances of hearing, balance, or both.

Precautions

Although the problem of imbalance in older persons can be complex, there are a few simple precautions that everyone can follow to help ensure an active old age. Balance in standing and walking is at least partly a skill that older adults can learn to maintain and/or improve, and it is dependent on good general physical condition. Therefore, sound nutritional and health habits—including regular exercise, such as walking or participating in Tai Chi—can go a long way toward preventing balance trouble.

A tendency to fall and symptoms of dizziness should not be dismissed as unavoidable consequences of aging but may be important signs of a disease that might be cured or controlled.

In older people, a regular physical examination by a doctor familiar with the problems of aging can help identify and correct potential problems before a serious fall. In addition, making sure that the elderly person's environment is safe (with good lighting, secure footing, clear walkways, handrails and anti-skid devices in bathrooms, etc.) can help prevent falls and their attendant injuries.

The elderly have a higher risk of contracting many different kinds of diseases. As a result, the average elderly person is more likely to have a disease that interferes with balance than a younger person. A tendency to fall and symptoms of dizziness should not be dismissed as unavoidable consequences of aging but may be important signs of a disease that might be cured or controlled. The vestibular system should not be ruled out as a source of these symptoms.

The ability to move about freely is an important factor in the quality of life for both younger and older people, and a healthy vestibular system is vitally important to freedom of movement.

Reference

1. Ko CW, Hoffman HJ, Sklare DA. *Chronic Imbalance or Dizziness and Falling: Results from the 1994 Disability Supplement to the National Health Interview Survey and the Second Supplement on Aging Study.* Twenty-ninth MidWinter Meeting of the Association for Research in Otolaryngology (ARO); National Institute on Deafness and Other Communication Disorders (NIDCD). Feb. 2006.

Further reading

Additional information about vestibular disorders, diagnosis and treatment options, coping tips, and contact information for medical specialists may be found by visiting the Web site of the Vestibular Disorders Association (VEDA) at www.vestibular.org. In addition to reading information displayed on Web pages, visitors can download and print many of VEDA's short publications for free.

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