

Questions?

Your questions are important. Call your doctor or health care provider if you have questions or concerns. UWMC clinic staff are also available to help.

Appointments: Call Otolaryngology – Head and Neck Surgery Center, 206-598-4022.

Established patients with questions about your treatment plan: Weekdays from 8 a.m. to 5 p.m., call the Nurse Voice Mail Line, 206-598-7519.

After hours and on weekends and holidays, call 206-598-6190 and ask for the Otolaryngology resident on call to be paged.

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Otolaryngology – Head and Neck Surgery Center

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206-598-4022

Remember that exercise and activity are the keys to staying fit and improving your balance. Taking part in an exercise program is essential. Even if you can't walk, using exercise machines and doing water exercises can help.

Safety Tips to Prevent Falls

Try these tips to help prevent falls:

- Use night lights.
- Wear shoes with good support, even in the house. Avoid slipper soles, slip-ons, and flip-flops that can make you trip.
- Hold onto railings when walking up or down stairs.
- Do not stand on ladders and chairs.
- Use grab bars in the shower and wherever else you need them.
- Remove any slippery rugs from your home.
- Keep paths clear of clutter.
- Use different colors on stair edges to make them stand out.
- Use a cane or walker if it keeps you more stable.
- Get help for tough jobs.
- Avoid taking risks!

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Presbystasis

Age-related balance problems

As we age, the parts of the inner ear that control our hearing and balance become less sensitive. These inner ear changes can cause balance problems and raise your risk of falling.

Presbystasis is the medical terms for age-related balance problems. **Presby** means elder; **stasis** means balance. The amount of loss of balance varies widely from person to person, and so does the amount of improvement a person might have from balance therapy.

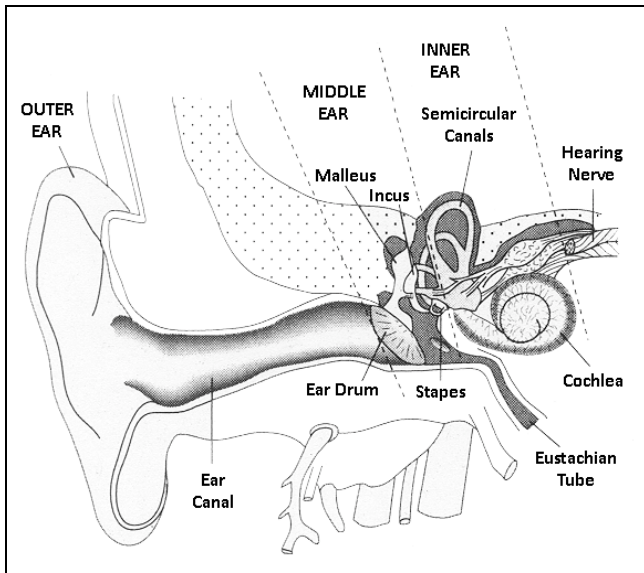
This booklet explains presbystasis and offers tips to help lower your risk of falls due to balance problems. It also gives tips to help you stay as active as possible.

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About the Body's Balance System

Our balance system depends on the signals sent to our brains from our inner ears, eyes, joints, and muscles. Our brains use this information to help us keep our balance.

If any part of this system is not working well, our balance may be affected. If more than one part is not working well, we have even more difficulty. For people with no inner ear balance function, walking can be very hard. Walking in the dark with no visual clues may be impossible.



Structures of the inner ear.

Sensors and Balance

The part of the inner ear that controls balance is called the *vestibular system* (see picture on page 4). It is made up of 5 sensors in each ear. Each sensor responds to different signals and helps us keep our

During the CDP test, you will stand on a mobile platform surrounded by a mobile wall. At different times during the test, the wall, the platform, or both will gently move as you move. Your job during this test is to keep your balance in each of these situations. There is no risk of falling during this test.

The CDP test takes about 30 minutes. Depending on the results, you may be referred to a physical therapist for vestibular rehabilitation or to a specialty clinic for more tests.



Standing on a mobile platform during the CDP test.

Treatment

Medical Therapy

In most cases, medicines do not help presbystasis and surgery is not recommended. Most patients are referred for balance therapy. Your doctor will also review any medicines you are taking to be sure they are not adding to your balance problem.

Balance Therapy

The goals of balance therapy are to improve your balance and help you be more active. You will work with a physical therapist who has special training for your balance therapy. Your therapist will teach you exercises to help stabilize your vision and improve your balance. You may also do strengthening and flexibility exercises for your legs and ankles. Your walking safety is also measured. Physical therapy will help you stay independent, safe, and active.

Follow-up Care

The Dizziness and Balance Center will monitor your progress during therapy. You may be asked to take another CDP test at a later time to check improvement.

When your eyes are moving like this, you feel like you are turning. This is the sensation of motion called *vertigo*. The VNG system detects how fast your eyes are moving, which gives us information about the sensitivity of your inner ear.

You may feel vertigo with the test, but this should stop as soon as your ear temperature returns to normal. Some people feel nausea after this test. Have someone come with you to drive you home in case this happens.

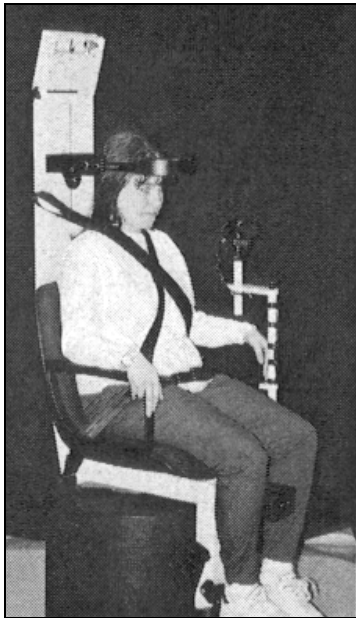
Rotary Chair Test

For the rotary chair test, you will sit in a motorized chair in a dark room. As the chair rocks gently back and forth, your eyes move back and forth in the opposite direction. The eye movements are the same as with the VNG, except that both ears are stimulated at the same time.

The chair test is much more sensitive than the VNG. Using it helps us interpret the results of the VNG.

Computerized Dynamic Posturography (CDP)

CDP tests your balance in different environments. The test assesses your ability to use information from your visual, vestibular, and muscle and joint systems to keep your balance. When one or more of these sensory systems is impaired because of aging, trauma, or disease, your balance can be greatly affected.



Sitting in a motorized chair for the rotating chair test.

balance and hold our vision steady. The main parts of this system are the three *semicircular canals*. One of these canals is horizontal, and the other 2 are vertical.

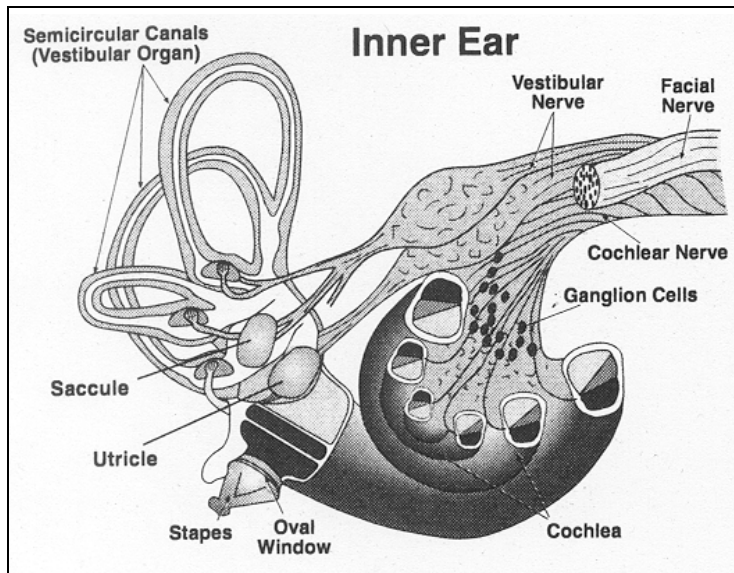
The vestibular system steadies your gaze. When you turn your head while looking at an object, the inner ear helps your eyes move in the opposite direction so that your view of the object stays steady.

One way to understand this is to think about a video made by someone carrying the camera on their shoulder: The horizon seems to move up and down with the footsteps. When you walk, you do not see this type of motion because your vestibular system makes the horizon appear steady.

Sensors in the 3 semicircular canals also sense when your head or body rotates, such as when you look to the left or to the right. This stimulates the horizontal canal to keep your gaze fixed straight ahead. Sensors in the other 2 canals stabilize your gaze when you bend over or turn from side to side.

The 2 other sensors, the *utricle* and *sacculle*, detect the pull of gravity on your body as well as motion in a straight line, such as when you are bouncing on a trampoline or moving in a car.

The signals from the 5 sensors work together. Turning your head to the right makes the right sensor increase its signals and the left side decrease its signals. The brain receives a balanced set of signals that it interprets as motion. A problem occurs when the 2 sides are not balanced, or when both sides do not send signals.



Symptoms of Presbystasis

Vision and Balance

The most common symptom of presbystasis is losing your balance when you move your head or change your body position. This is because your inner ear cannot tell your body where your head has moved. This makes it hard to combine visual information from your moving head with movement information from your body. After a moment, your brain adjusts and your balance returns. But if this happens every time you move your head, after a while you become uncomfortable, and you may feel sick to your stomach.

Losing Your Balance

You may become disoriented and lose your balance when you walk down the aisle in a grocery store and turn your head and eyes from side to side to see items on the shelves. Walking can become very hard in general, because it's hard to keep your balance when things seem to be moving. As you get older, everyday activities such as walking, getting up from a chair, or rolling over in bed may get harder to do.

Presbystasis can also make it hard to keep your balance in the dark. Since older people often develop cataracts and other vision problems, also having presbystasis may make it very hard to get around.

Diagnosis and Tests

Balance depends on a combination of vestibular, eye, and muscle sensations. People can balance fairly well with only 2 of these systems working, but not when only 1 is working.

These 3 things are done to diagnose presbystasis:

- A doctor's examination.
- Balance tests such as the *videonystagmography* (VNG) or the *rotary chair* (see below on this page and on page 6).
- Measuring your posture and balance on the *posturography platform* or CDP test (see pages 6 and 7).

The VNG and rotary chair tests tell us how much inner ear function you have lost. The CDP test tells us if other parts of your balance system are involved. Together, these tests help us make the diagnosis of presbystasis, judge its severity and cause, and plan your rehabilitation therapy program.

Videonystagmography (VNG)

VNG measures the sensitivity of 1 of the vestibular sensors. It consists of 2 tests: an eye movement test to make sure that your eyes move normally and an ear function test. In the ear function test, first cold and then warm air is directed into your ear canal. This changes the temperature in your horizontal semicircular canal. This change stimulates the sensor, resulting in a sensation of head motion and *nystagmus*, a jerky movement of the eyes.