

# YOUR BALANCE IN 4 PAGES

## WHAT IS THE BALANCE SYSTEM?

You were referred to our clinic because you have spoken with your doctor about your symptoms of dizziness, lightheadedness, or unsteadiness. Dizziness is a term used to broadly describe how we feel when our sense of balance is impaired. Dizziness also is the second most common complaint that patients report to their doctors. The sensations of dizziness are not the same for all people and you should know that there are many medical problems that cause the symptoms that patients report as vertigo, unsteadiness, wooziness, dizziness, and, lightheadedness that are not related to the inner ears of balance. These include circulatory problems, low blood sugar, and, thyroid disorders, just to name a few.

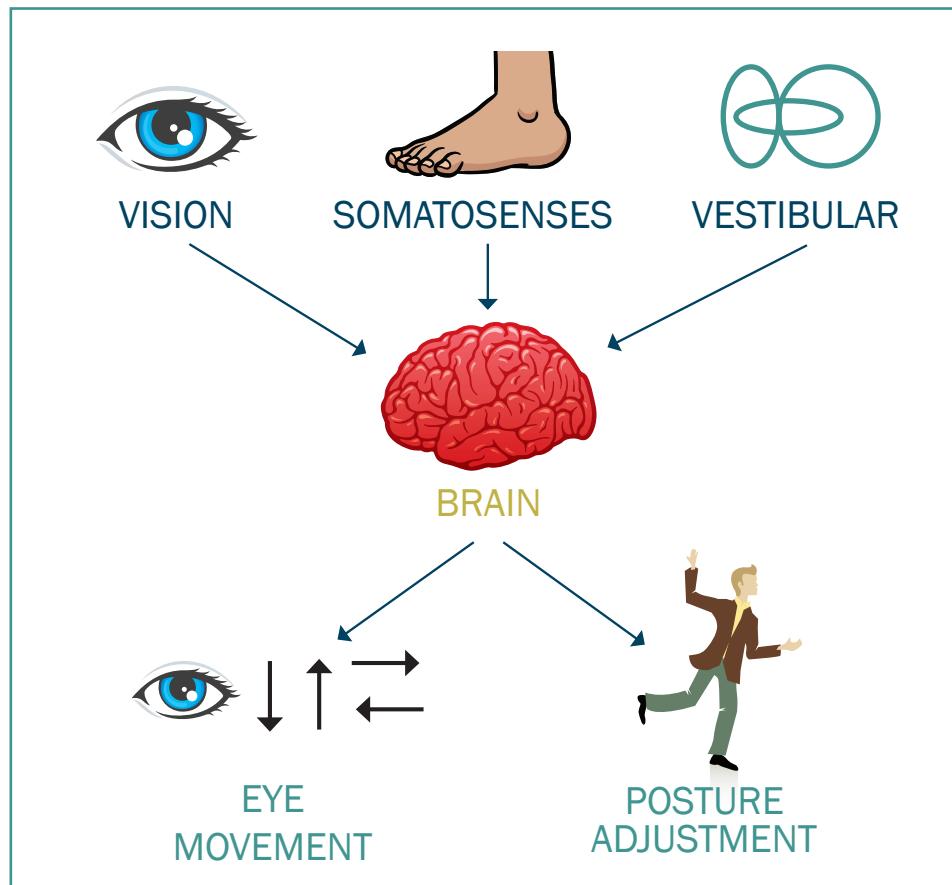
When you report dizziness to your doctor, the challenge is to determine what is causing this sensation.

Diagnosing the underlying cause of a dizziness problem is a complex process often requiring several tests that collectively are referred to as a **balance function assessment**. In addition to the inner ears, we use the senses of vision, and the somatosenses to help maintain our balance and orientation. The somatosenses include touch, pressure, vibration

and position senses. Vision tells us where we are with respect to the horizon. The **somatosenses**, for our purposes, refer to our ability to sense vibration, pressure and position of the feet, ankles and knees.

The tests you had today focused on the dizziness or vertigo that can be caused by a disturbance in a particular part of the inner ear called the **vestibular system**. This is the part of your balance system that provides your brain with information about

movements of the head and head and body together. The vestibular system informs the brain about movement of the head and body. When the inner ears of balance are not working properly you might receive false senses of movement (you might feel like you are moving when you are not moving at all.) Also, since the inner ear of hearing is physically connected to the inner ear of balance they may both be impaired at the same time. In this situation you may experience hearing loss, and ringing in the ears in addition to dizziness.

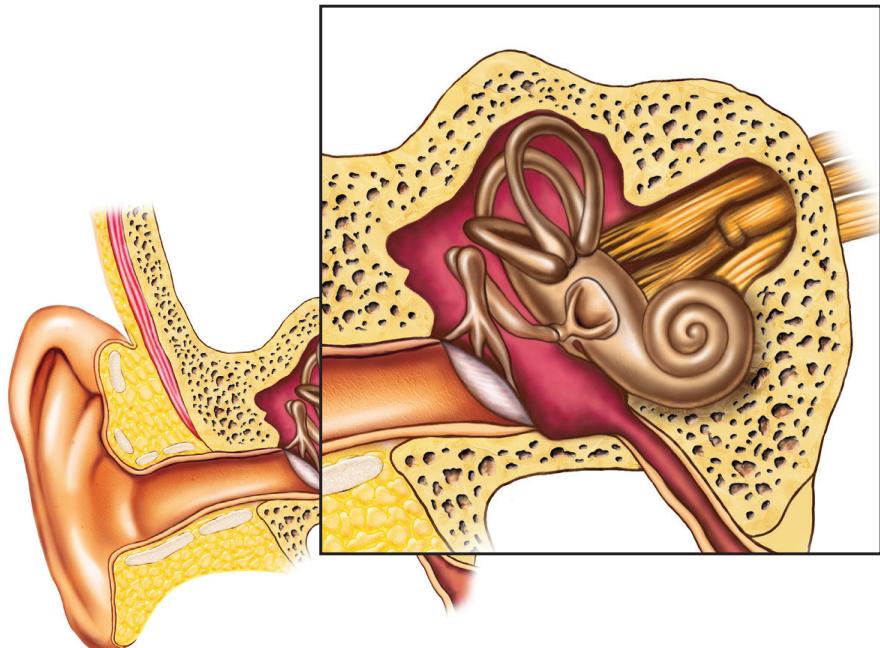


# HOW DOES MY INNER EAR OF BALANCE WORK?

Instead of having one inner ear of hearing on each side we have five inner ears of balance on each side. Like the inner ears of hearing, the inner ears of balance are filled with fluid and have nerve fibers that are stimulated by movement of your head. The five inner ears of balance on each side make it possible for your brain to know where your head is moving to, and how quickly it is moving.

The inner ears of balance are connected with a number of other parts of your brain. For instance, your inner ear of balance connects to brain pathways that move your eyes. In this way, when you turn your head to the right, your eyes automatically move to the left. Alternately, when you turn your head to the left, your eyes automatically move to the right. These are inner ear reflexes. Your inner ears of balance also connect to your spinal cord pathways. It is these connections that make it possible for your brain to detect when you are losing your balance and to correct your posture to keep you from falling over.

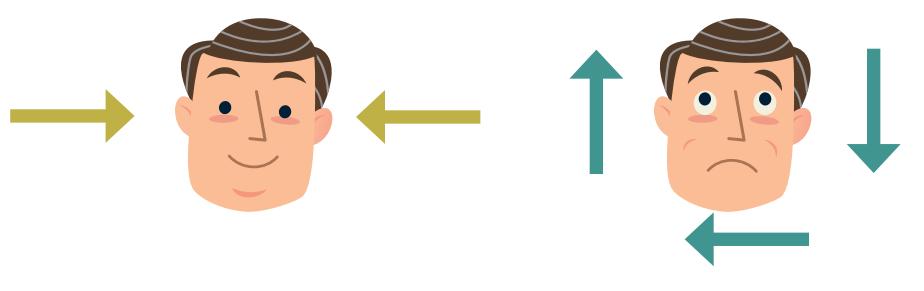
The inner ears of balance send electricity to the brain...even when you are sitting still! When you are sitting still, both inner ears of balance send equal amounts



of electricity to the brain. It is this equilibrium that your brain interprets as sitting still. When you turn your head to the right, the right inner ear sends more electricity to the brain and the left inner ear sends less (and in darkness an inner ear reflex moves your eyes to the left). When you turn to the left the opposite happens, the left inner ear sends more electricity to the brain and the right inner ear sends less (and in darkness the opposite happens and the inner ear reflex moves your eyes to the right). Now, consider what would happen if you were sitting still but your left inner ear stopped sending electricity to the brain.

**In this situation, your brain would be receiving more electricity from the right inner ear, which normally would happen if you were rotating to the right side. In this situation, even though you knew you were sitting still, your brain would be receiving an electrical code it normally would receive if you were turning to the right and that is, indeed, the sensation you would experience.**

Also, the eye reflex, in the opposite direction, that normally occurs when you turn your head would make you see things moving in front of you. When patients say they are dizzy we begin to think that possibly they may have a weak inner ear of balance on one side. We will work as a team to figure this out.



# WHAT WERE THE RESULTS OF MY TESTS? DO I HAVE A WEAK INNER EAR?

Today you have undergone a series of tests that are designed to tell us to what degree one inner ear of balance is stronger than the other. The result of these examinations have shown us that your \_\_\_\_\_ inner ears are weaker than normal.

The caloric examination (water test) has told us that your

**LEFT      RIGHT      BOTH      NEITHER** (you had a normal test)

**LEFT      RIGHT**

inner ear is \_\_\_\_\_% weaker than the other (a difference of 22% or more is considered significant).

## WHAT HAPPENS NOW IF I HAVE LOST FUNCTION IN ONE OF MY INNER EARS OF BALANCE?

In most cases, if you lose your hearing in one ear it is permanently gone. If you lose your vision in one eye it is also usually permanently gone. However, if you lose function in one inner ear of balance, your brain, in most cases, has the capability of compensating for this loss so that you are not dizzy forever. In fact, when we lose all, or part, of one inner ear of balance, if we remain safely active, and, if medications that chemically disconnect the inner ear from the brain are not used for long periods of time (these can include vestibular suppressant medications), the brain will compensate for this loss.

Exceptions to this rule are:

- 1) where brain diseases exist that impede the compensation process,
- 2) where patients have vestibular diseases that cause the function of the inner ears of balance to change from day-to-day,

3) for elderly patients where the brain connections exist to help compensate, but where they are not as efficient as they were in younger years. In these cases brain compensation may not occur, or, may occur but be less than perfect.

The **rotational test** you had today tells us whether your brain has compensated for a loss of inner ear function on one side.

The results of this test has shown that, if you have a weak inner ear on one side, your brain \_\_\_\_\_ compensated for the loss of function in your weak inner ear.

**HAS      HAS NOT  
NOT APPLICABLE**

Another cause of dizziness is having weak or absent function in both inner ears. This can be caused by inner ear or balance

nerve diseases, or the use of medications that in addition to helping cure disease, can reduce function in the inner ears of balance (and sometimes hearing). Weak function in both inner ears results in a loss of the ability to keep objects from moving in front of us when we are moving. In these cases the surroundings bobble around in front of us as we move. Patients with two weak inner ears rely more on vision and the somatosenses to help them keep their balance. Because of this, patients with weak or absent function in both inner ears fall when they attempt to stand or walk in darkness.

The results of today's testing has shown that you:

**DO      DO NOT**

have weak, or absent, inner ear function on both sides.

# WHAT IS THE EFFECT OF MY BALANCE PROBLEM ON MY ABILITY TO FUNCTION IN EVERYDAY LIFE?

## DIZZINESS HANDICAP INVENTORY SCREENING VERSION (DHI - S)

		Yes (4)	Sometimes (2)	No (0)
1E	Because of your problem, do you feel depressed?			
2P	Does walking down a sidewalk increase your problem?			
3E	Because of your problem, is it difficult to concentrate?			
4F	Because of your problem, is it difficult for you to walk around your house in the dark?			
5P	Does bending over increase your problem?			
6F	Because of your problem do you restrict your travel for business or recreation?			
7F	Does your problem interfere with your job or household responsibilities?			
8E	Because of your problem, are you afraid to leave your home without having someone accompany you?			
9E	Because of your problem, have you ever been embarrassed in front of others?			
10F	Does your problem significantly restrict your participation in social activities such as going out to dinner, going to movies, dancing or to parties?			
TOTAL SCORE				

The results of your testing suggest that you perceive that your dizziness problem has resulted in a \_\_\_\_\_ self-report dizziness handicap.

MILD

MODERATE

SEVERE

## NOW THAT I HAVE COMPLETED THIS SERIES OF TESTS, WHAT'S NEXT?

Most likely, you are seeing an ear specialist for problems with dizziness/unsteadiness. Depending on the results of your tests, your doctor may arrive at a diagnosis and treat you, or refer you on for additional testing if they are still searching for an answer. Your doctor will discuss with you further the results of your examination today and what treatment(s) might benefit you.