

FACT SHEET



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How does the balance system work?

Your sense of balance comes from many different systems working together to create stability of your body and your vision.

Good balance depends on:

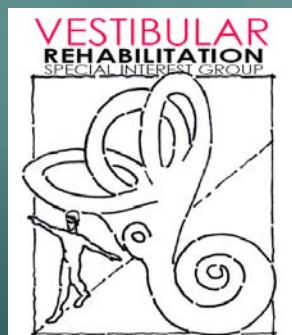
1. Correct sensory information from your eyes (**visual system**), muscles, tendons, and joints (**proprioceptive input**), and the balance organs in the inner ear (**vestibular system**).
2. The **brain stem** making sense of all this sensory information in combination with other parts of the brain.
3. Movement of your eyes to keep objects in your vision stable and keep your balance (**motor output**).

Visual system: Your vision helps you see where your head and body are in relationship to the world around you and to sense motion between you and your environment.

Proprioceptive input: Special sensors sensitive to stretch or pressure in your muscles, tendons, and joints help your brain to know how your feet and legs are positioned compared to the ground and how your head is positioned compared to your chest and shoulders.

Vestibular system: Balance organs in the inner ear tell the brain about the movements and position of your head. There is a set of three tubes (semi-circular canals) in each ear, and these sense when you move your head around and help keep your vision clear. There are also two structures in each ear called otoliths (the utricle and saccule). They tell the brain when the head is moving in a straight line (like when you are riding in a car or going up or down in an elevator) and sense the position of the head even when it is still (if it is upright or tilted).

Putting it all together--the brain stem: Information from your vision, muscles, tendons, joints, and balance organs in your inner ear are all sent to the brain stem. The brain stem also gets information from other parts of the brain called the cerebellum and cerebral cortex, mostly about previous experiences that have affected your sense of balance. Your brain can control balance by using the information that is most important for a particular situation. For example, in the dark, when the information from your eyes is reduced or might not be accurate, your brain will use more information from your legs and your inner ear. If you are walking on a sandy beach during the day, the information coming from your legs and feet will be less reliable and your brain will use information from your visual and vestibular systems more.



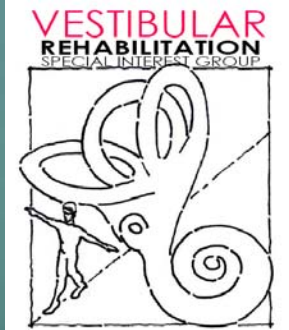
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Balance System



Motor output: Once your brain stem sorts out all of this information, it sends messages to the eyes and other parts of your body to move in a way that will help you keep your balance and have clear vision while you are moving.

How can physical therapy help improve my balance?

If you feel off balance or dizzy, one of these systems may not be working correctly, or the information from these systems may not be being “put together” or “integrated” correctly. A physical therapist can help to determine how you are using these systems (or not) to keep your balance and can instruct you in exercises that can improve how your body uses all these systems together.



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