

Balance: To Find It You Have To Lose It

What is balance? During human movement, balance is the ability to stay upright and under control while seated, standing, or in motion.

A body in motion is a complex set of inputs and outputs. Your central nervous system (your brain) receives input from your eyes, vestibular system (inner ear), and proprioceptors. Proprioceptors are specialized cells that detect changes in muscles, tendons, and joints. Through a complex relay network, your eyes, vestibular system, and proprioceptor cells talk to your brain (conscious and subconscious), which manages all the information in less than an instant to come up with the right answer about where everything is and where it's headed, and what will happen if it keeps doing what it's doing. This brain talk enables coordinated movement in different body parts so that you maintain balance and a sense of where your body is in space.

As to what body part moves first to keep you balanced, there *is* a hierarchical order, which runs from ankles, arms, and torso to moving your feet. It's always first things first. Here's an example. Close your eyes and stand on one leg. You will feel your ankle making small adjustments to keep you balanced. If these adjustments aren't enough, your arms will move anywhere from a little to a lot as you fight for stability. Still not steady? Your brain is now decidedly unhappy about the situation, and brings your torso into play, twisting and turning in its quest for equilibrium. In a final desperate attempt to stay in place, you will hop or touch your other foot to the ground.

It's your proprioceptive system that can *learn* balance. You can see that by watching the nearest two-year-old who's learning to walk. They're "toddlers" because of their off-balance and somewhat clumsy locomotion, which is cute (on a two-year old) and *does* improve with age. Walking is a complex task for a toddler because the proprioceptive pathways are underdeveloped. Repeated attempts at walking create crucial links between a young brain and the body's muscles, tendons, and joints. With repetition, these pathways become as efficient as a well-oiled machine and information zips along without any conscious thought process. When was the last time you *thought* about walking?

New movements, combined movements, and movements around environmental obstacles don't always fit neatly into established proprioceptive pathways. For example, you've stepped from a concrete walkway to a grass lawn a zillion times. A proprioceptive pathway has been established, and ankle adjustments are automatically made to keep you balanced when stepping from a hard to a soft surface. But it takes skill and practice to develop automatic anatomical adjustments for walking on uneven surfaces or climbing stairs. If you stumble, your moves *have to* be automatic. You sure don't have time to think about it.