Mastering BALANCE *After Limb Loss*

Essential Tips for Prosthetic Users and Coaches

By Megan Williamson, BA, NASM CPT

When we think about exercises to improve balance, standing on one leg might be the first thing that comes to mind. While that's one method, it's not the only way – nor is it always the most effective, especially for prosthesis users. Balance is more than just keeping yourself upright; it's about stability in motion, confidence in movement, and adapting to real-life challenges.

For those with lower limb loss, balance challenges are common and can impact how effectively a prosthetic device is used in daily life. However, by training the body's key balance systems, prosthesis users and fitness professionals alike can unlock greater mobility, confidence and independence.

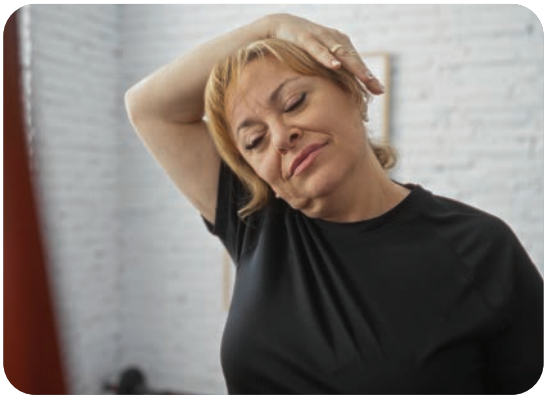
Understanding Balance in Everyday Life

Balance is the even distribution of weight that allows us to stay steady. But from a training perspective, it's much more complex. The body relies on three key neurological systems to maintain balance: proprioception, the vestibular system, and vision. Each system plays a role in movement, stability and coordination, and understanding them is key to effective training.

1 Proprioception: The Body's Internal GPS

Proprioception is the body's ability to sense its position in space. It allows you to know where your limbs are without looking. However, for those with limb loss, proprioceptive feedback is altered or reduced due to changes in sensory input. Scar tissue, nerve damage, and the absence of a natural limb can impact how the body perceives movement.

TRAINING TIP: Traditional proprioceptive exercises that rely on feeling the floor (such as barefoot balance drills) may not be as effective for individuals with compromised proprioception due to trauma or limb loss. Instead, incorporating visual and vestibular cues can be more beneficial. For example, using mirrors during movement training or focusing on upper body proprioception can enhance overall balance.



2 The Vestibular System: The Body's Inner Gyroscope

The vestibular system, located in the inner ear, detects head position and movement. It works closely with vision and is a priority system in the brain for maintaining equilibrium.

TRAINING TIP: Challenging the vestibular system can improve overall balance. Closing your eyes while performing an exercise (with safety measures in place) or practicing controlled head movements while balancing, can help strengthen this system.

3 The Visual System: Your Eyes as a Balance Tool

The visual system is a significant component of balance, with six of our 12 cranial nerves dedicated to vision. Our visual system interprets our environment and adjusts our movements accordingly.

TRAINING TIP: Fixing your gaze on a stationary point can enhance stability. Conversely, challenging vision – such as tracking a moving object while performing an exercise – can improve adaptability and spatial awareness.

How Trainers Can Support Prosthesis Users

For fitness professionals, understanding these balance systems can transform how they support a client with limb loss. Here's how coaches and instructors can apply this knowledge in practical ways for you:

Assessing Balance System Strengths

Identify which system is dominant for you. Do you rely more on vision for balance, for example? Do you feel unstable when your head moves? Exercises can be tailored to strengthen your weaker areas.

Modifying Traditional Balance Drills

Instead of only using one-leg stances, try dynamic drills such as:

- Seated weight shifts (for early-stage prosthesis users)
- Controlled step-ups with vision tracking
- Balance training with soft surfaces or perturbation exercises

Considering Alternative Cues

Tactile feedback, auditory cues, visual target cues, and verbal reinforcement can help when your proprioceptive input is limited.

Ensuring Safety and Comfort

Not everyone feels comfortable with removing their prosthesis for certain drills. Adjusting movements to suit your comfort level and functionality is important too.

Practical Exercises for Balance Training

Here are some simple yet effective ways to challenge and enhance balance:

Visual System Challenge

Focus on a fixed point while balancing on a stable or unstable surface.

Vestibular System Challenge

Close your eyes while maintaining a stable stance or add slow, controlled head movements.

Proprioception Challenge

Use a textured surface to increase feedback from your prosthetic limb or residual limb.

By targeting these systems, we can enhance stability in functional movements – whether it's walking, wheeling, transferring or navigating everyday obstacles.

The Bigger Picture: Balance Beyond the Gym

For prosthesis users, balance training is not just about standing still – it's about confidence in daily life. From stepping from a curb to carrying groceries, every movement relies on an intricate balance between neurological input, muscle activation, and coordination. The more we train balance in relevant, real-world ways, the greater the impact it has on independence and mobility.

As a coach, my mission is to bridge the gap between rehabilitation and fitness, ensuring that all individuals – trainers and clients – have the knowledge to move confidently and efficiently. Whether you're navigating balance after limb loss or coaching clients through their adaptive fitness journey, understanding the body's balance systems is a game-changer.

ABOUT OCEAN REHAB AND FITNESS: Megan Williamson is a certified fitness coach through the National Academy of Sports Medicine and the head coach at Ocean Rehab and Fitness. Alongside her team, she offers adaptive training for those living with physical disabilities. Her mission is to make exercise inclusive for everyone regardless of limitations.

For exercise ideas, workout programs or a consultation, visit oceanrehabandfitness.com.

Follow Megan's programs with an Ocean Insider Club membership subscription.