



Understanding Balance

A Neuro Physical Therapist's Guide for
Patients and Families



What Keeps You Balanced

Team Effort Between Three

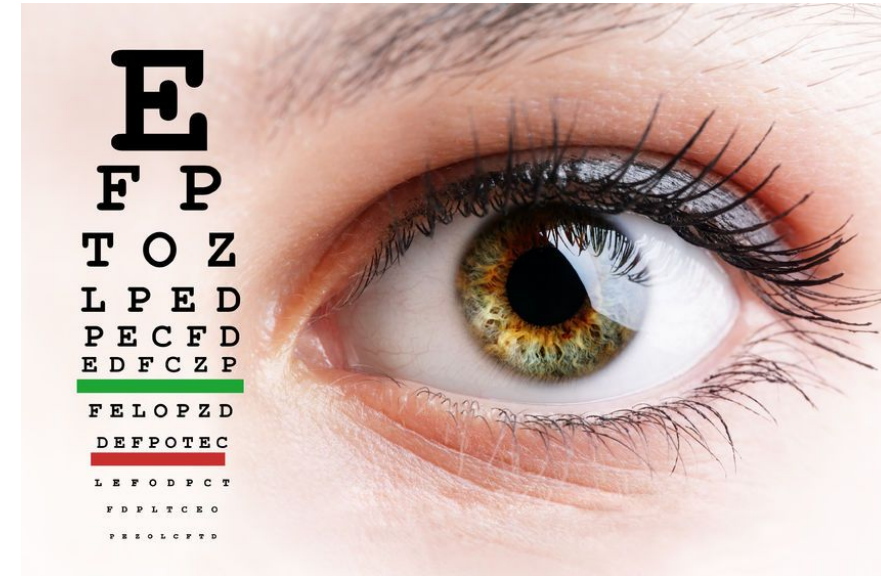
Multi-system process involving:

1. Sensory input
 - a. Proprioception
 - b. Vision
 - c. Vestibular
2. Motor output
3. Cognitive processing.



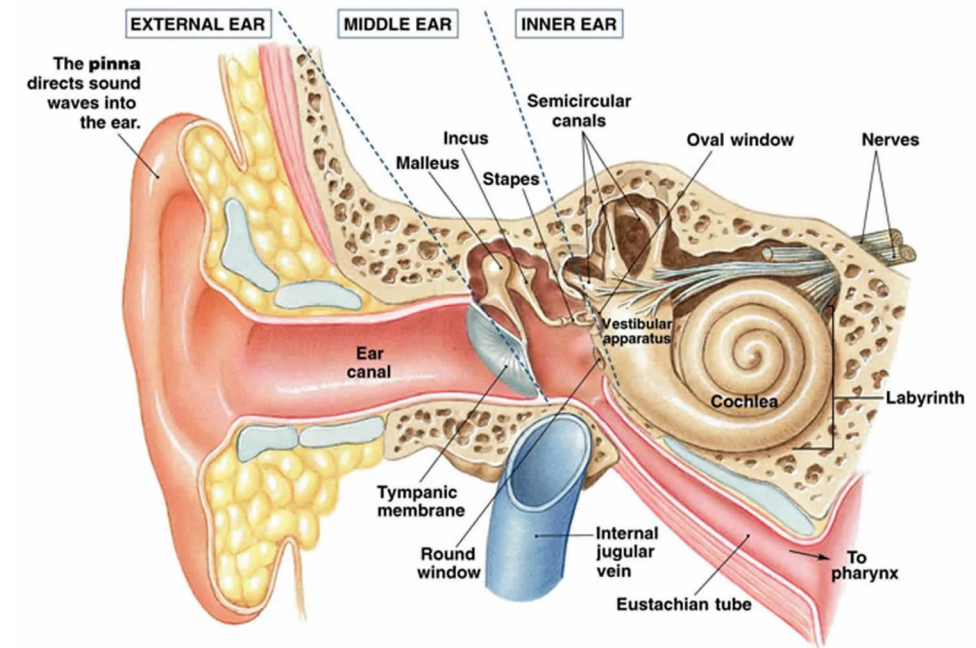
Sensory System: Vision

- Vision provides orientation, depth perception, and environmental awareness.
- Common neurological changes: blurred vision, double vision, difficulty scanning, reduced contrast sensitivity.
- Home strategies: **improve lighting, reduce glare, use high-contrast objects, practice scanning tasks.**



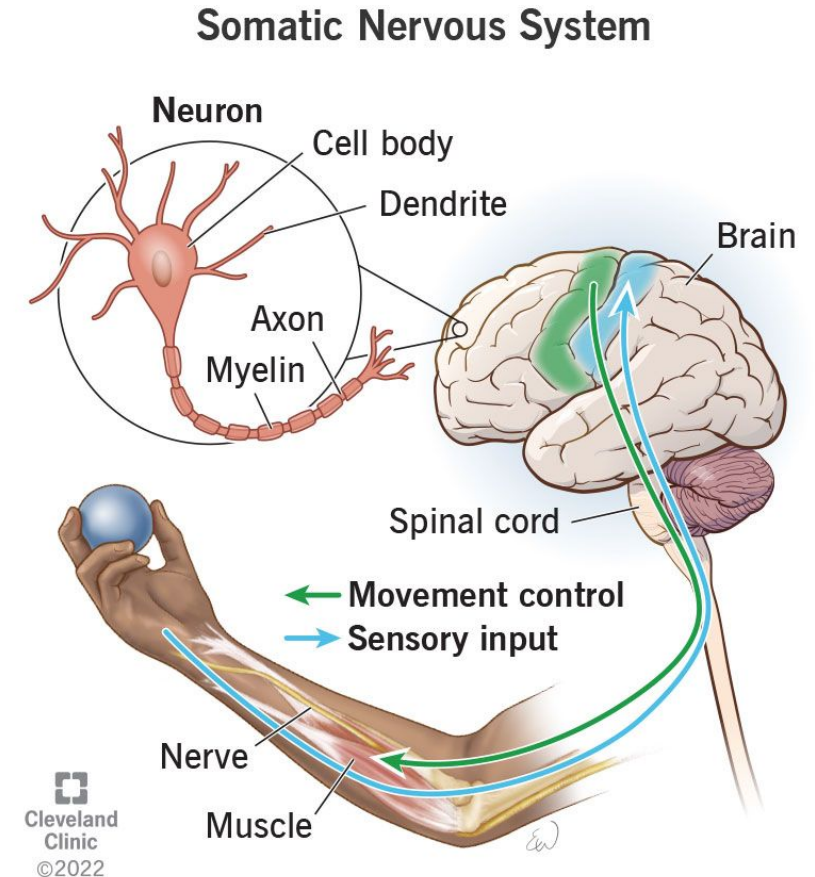
Sensory System: Vestibular

- Located in the inner ear; detects head movement, rotation, and acceleration.
- Essential for steady gaze & postural control.
- Neurological conditions may cause dizziness, vertigo, imbalance, or difficulty turning.
- Home strategies: **highly depends on condition**, slow head turns, gaze stabilization exercises, controlled positional changes



Sensory System: Somatosensory

- Includes **proprioception, touch, and pressure** from the feet and legs.
- Tells the brain how the body is positioned and how it's moving.
- Neurological changes: neuropathy, reduced sensation, delayed feedback, weakness.
- Home strategies: barefoot practice on safe surfaces, weight-shifting, tapping feet to increase awareness.

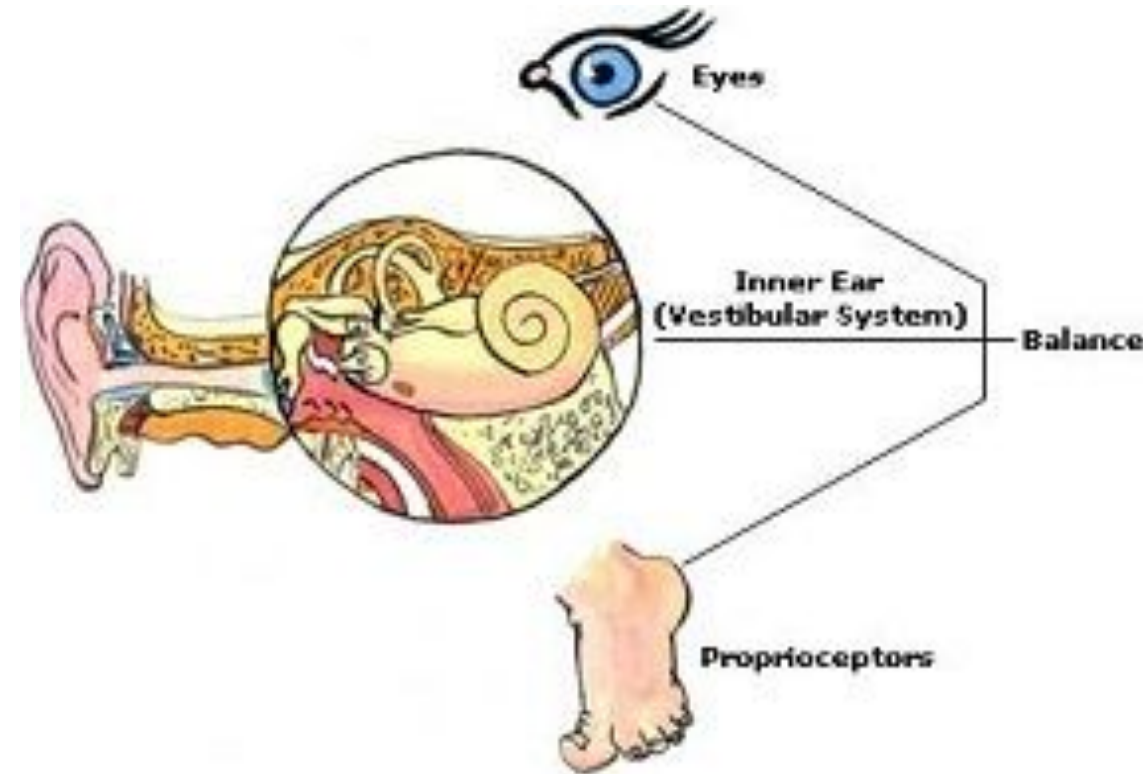


Sensory Systems Influence

What creates your “balance”

Balance uses three systems: vision, vestibular, and somatosensory.

- When one system is damaged, the brain shifts to **sensory reweighting** — relying more on the remaining systems.
- Evidence shows targeted exercises can **compensate** (strengthen the intact systems) and **retrain** the weak system through neuroplasticity.



Motor Systems Influence

Strength, Coordination & Postural Control

- Muscles must respond quickly and accurately to sensory input.
- Weakness in quads, glutes, calves, or core reduces stability.
- Coordination issues can cause slow or inaccurate stepping reactions.
- Postural control relies on anticipatory adjustments (preparing before moving).
- Home strategies: sit-to-stand, heel raises, marching, mini-squats, core activation.

Examples of Exercises

Targeting Proximal Strengthening



Cognitive Systems Treatments

Higher Level Balance Impairments

- Balance requires focus, processing speed, and decision-making.
- Dual-tasking (walking + talking) challenges the brain's ability to divide attention.
- Neurological conditions may slow reaction time or reduce ability to multitask safely.
- Home strategies: add simple cognitive tasks to movement (counting, naming categories), practice stopping/starting.

Safety First!

- **Red flags: sudden dizziness, new weakness, severe headache, sudden numbness**
 - Receive Medical Assistance
- Practice near a stable surface
- Remove clutter, pets, loose rugs; improve lighting.
- Use assistive devices correctly; avoid multitasking during high-risk tasks.
- Stop if symptoms escalate or balance worsens.

Home Exercises

Depends on where the impairment is originating from



- Task-specific training: practice the exact tasks you want to improve (stairs, turning, reaching).
- Strengthening: quads, glutes, calves, core
- Sensory reweighting: eyes closed, foam surface, narrow stance to train the brain to rely on different systems.
- Dual-task training: cognitive + motor tasks to improve real-world safety.

Build Your Program with Your Specialist

Evidence Based Ways to Improve Balance At Home

- Timing: 10–20 minutes, 4–6 days/week.
- Include: static balance, dynamic balance, functional tasks, and sensory challenges.
- Track progress: time held, number of reps, steadiness, confidence.
- Adjust difficulty gradually; communicate changes to your specialist

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