The Secret to Having Great Balance

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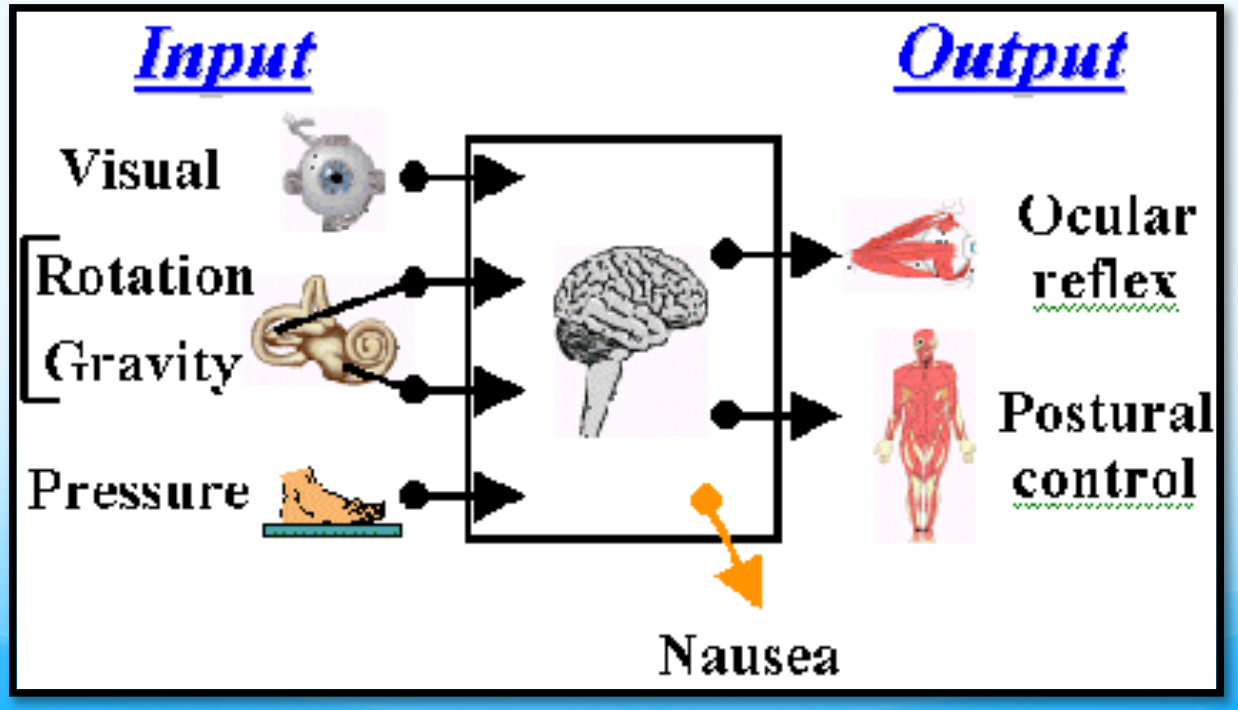
Objectives

- Components of Balance
- Impairments Affecting Balance
- Home Modifications
- Personal Safety
- Balance Testing
- Exercises

The Basics of Balance

- Integration of 3 Major Sensory Systems:
  - Visual
  - Somatosensory / Proprioception
  - Vestibular (Inner Ear)



Vision

- Our eyes tell us about the world around us
- Our brains use this visual feedback to orient ourselves relative to other objects
  - Gauge obstacles in our path
  - Sense motion within our environment
- Tend to rely on this system the most

Visual Impairments

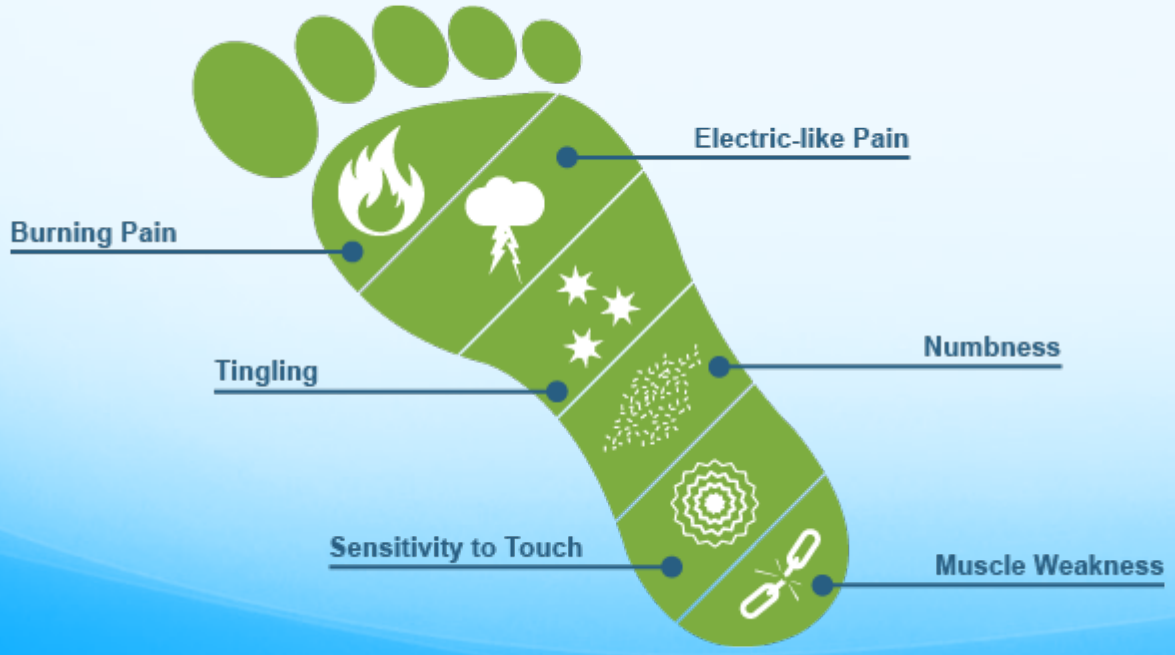
- Decreased vision overall can impair your sense of balance
  - Cataracts: Clouding of the lens
    - Blurry vision, Glare, Double vision, Not being able to see well at night
  - Glaucoma: Optic nerve damage due to increased pressure in eye
  - Macular degeneration: Destroys sharp, central vision
  - Presbyopia: Lens becomes less flexible (difficult to focus)
    - Natural part of the aging process. It is not a disease, and cannot be prevented.
  - Retinitis Pigmentosa: genetic eye disease leading to blindness
  - Diabetic Retinopathy: Affects blood vessels in the retina

Somatosensory / Proprioception

- Information from our extremities → joint position & contact with the world around us
- What your feet feel: is the floor level, is it soft, is it changing (i.e. sand), is it unstable (i.e. gravel)?
- Gives us a sense of our position in space and how we are moving

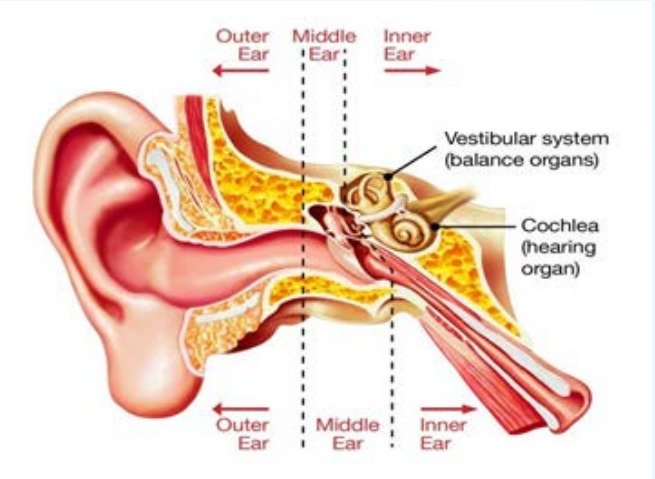
Proprioceptive Disorders

- Peripheral Neuropathy: a condition that results in damage to the peripheral nervous system.
  - numbness, tingling, or pain in the toes, feet, legs, hands, arms, and fingers
  - wasting of the muscles of the feet or hands

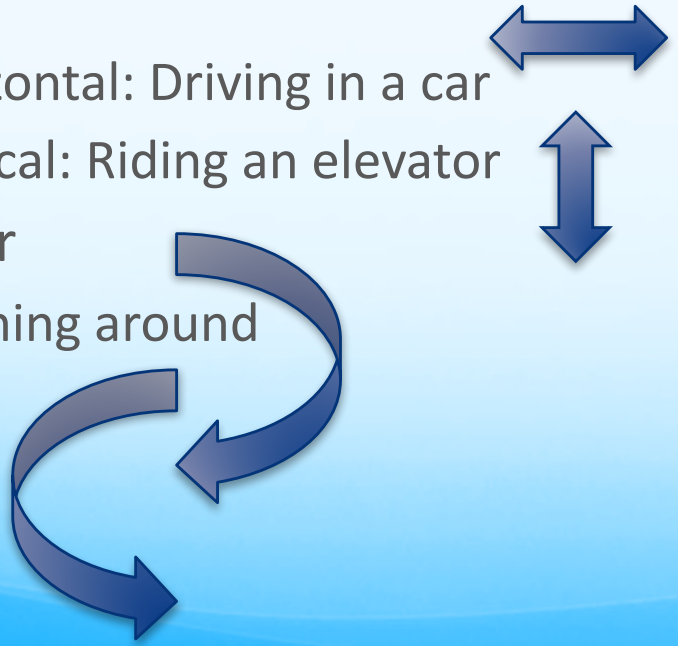


- Diabetic Neuropathies
  - A family of nerve disorders affecting those with diabetes. The most common is *Peripheral Neuropathy*

Vestibular



- Inner Ear balance system
- Information received by the vestibulocochlear nerve is transmitted to the brain to process sound & equilibrium
- Gives information re: angular and linear acceleration
  - Linear
    - Horizontal: Driving in a car
    - Vertical: Riding an elevator
  - Angular
    - Spinning around



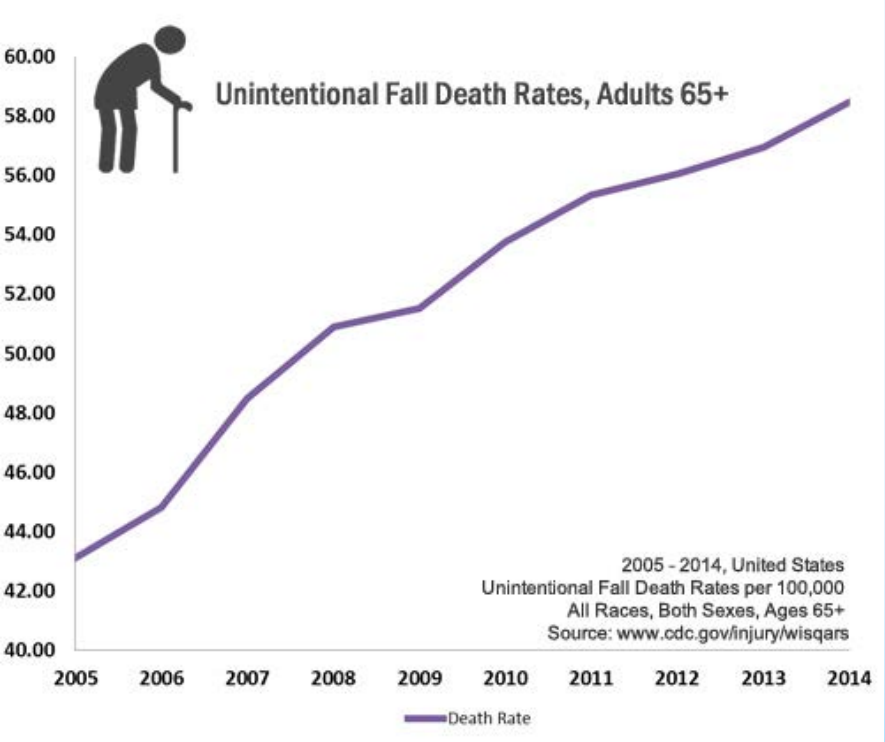
Vestibular Disorders*

[*that affect balance & hearing]

- Acoustic Neuroma
  - Compresses the vestibulocochlear near, usually causing hearing loss tinnitis, and dizziness or loss of balance
- Labyrinthitis or Vestibular Neuritis
  - Caused by an inner ear infection that inflames the nerve
- Ménière's Disease
  - Chronic; cause unknown, related to fluid imbalance in inner ear
- Otosclerosis
  - Overgrowth of bone between middle & inner ear
- Ototoxicity
  - Nerve damage resulting from drugs/aminoglycoside antibiotics
- Perilymph Fistula
  - A tear that allows fluid between the middle & inner ear
  - Often caused by head or ear trauma

Home Safety

- Simple changes to your home can dramatically decrease your risk for falls
- 1 out of 5 falls causes a serious injury such as a broken bone or head injury
- Over 800,000 patients a year are hospitalized due to fall
- >95% of hip fractures are caused by falling
- Adjusted for inflation, the direct medical costs for fall injuries are $31 billion annually

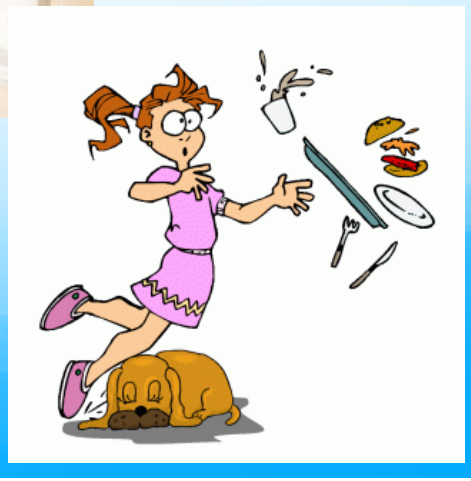


Simple At-Home Modifications

- Nightlights
- Non-slip rugs
  - Secure loose carpet
- Secure loose cords/wires
- Clear pathways by removing clutter
- Slippers with tread or gripper socks

Home Modifications (cont'd)

- Place frequently used items on lower shelves
  - Use a step stool to reach higher items (not a chair!)
- Grab bars
  - Toilet
  - Tub/shower
- Handrails
- Pets
  - Food/water bowls
- **Ask for Assistance!**



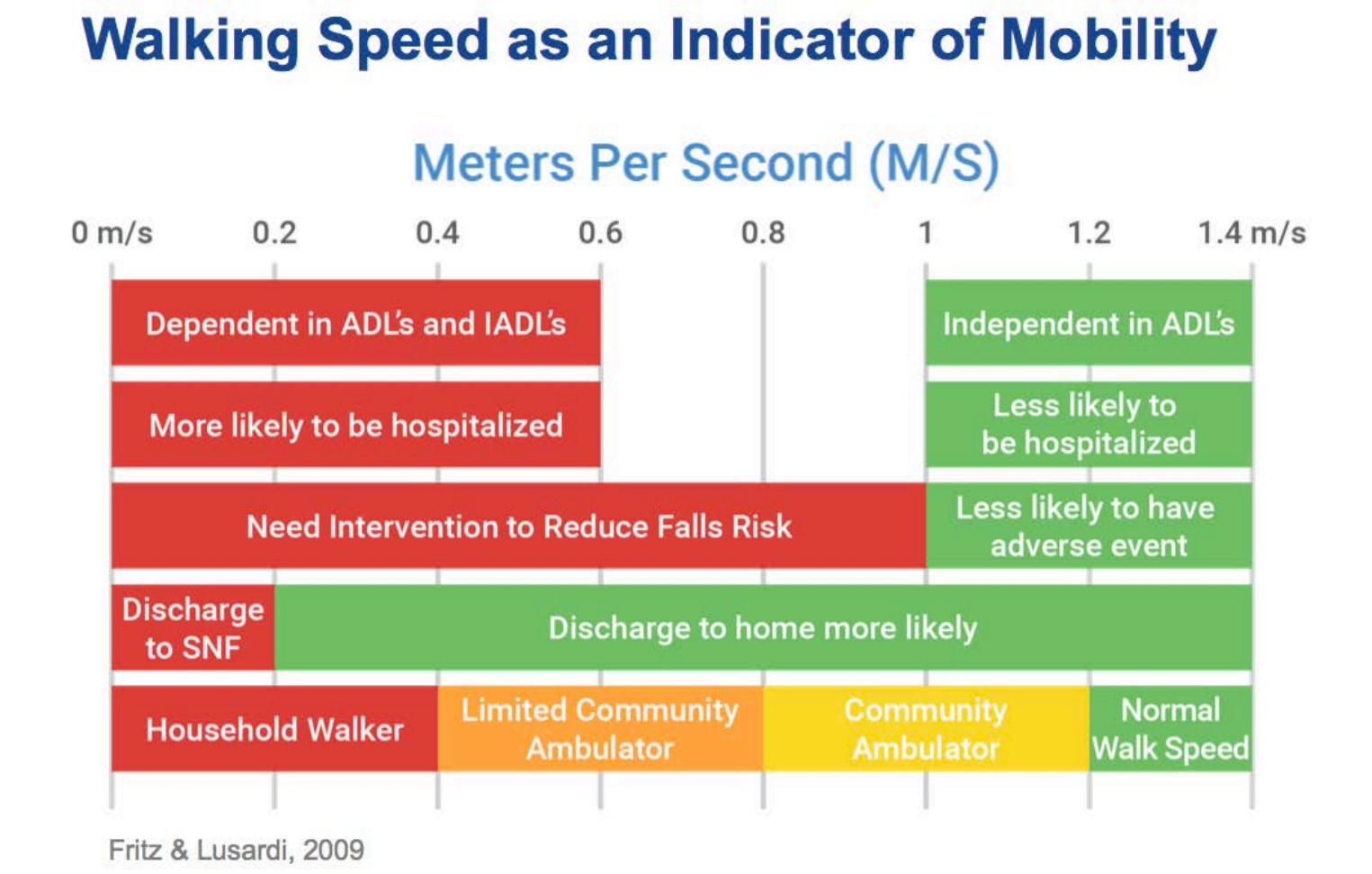
Personal Safety

- Annual Vision Checkup
- Medical ID Bracelet/Necklace
- Medical Alert Systems
  - Pendulum necklace
  - Medic alert necklace/bracelet
  - When unsure, ASK!
- EMS has access to video translation services
- And last but not least, exercise!

Baseline Tests

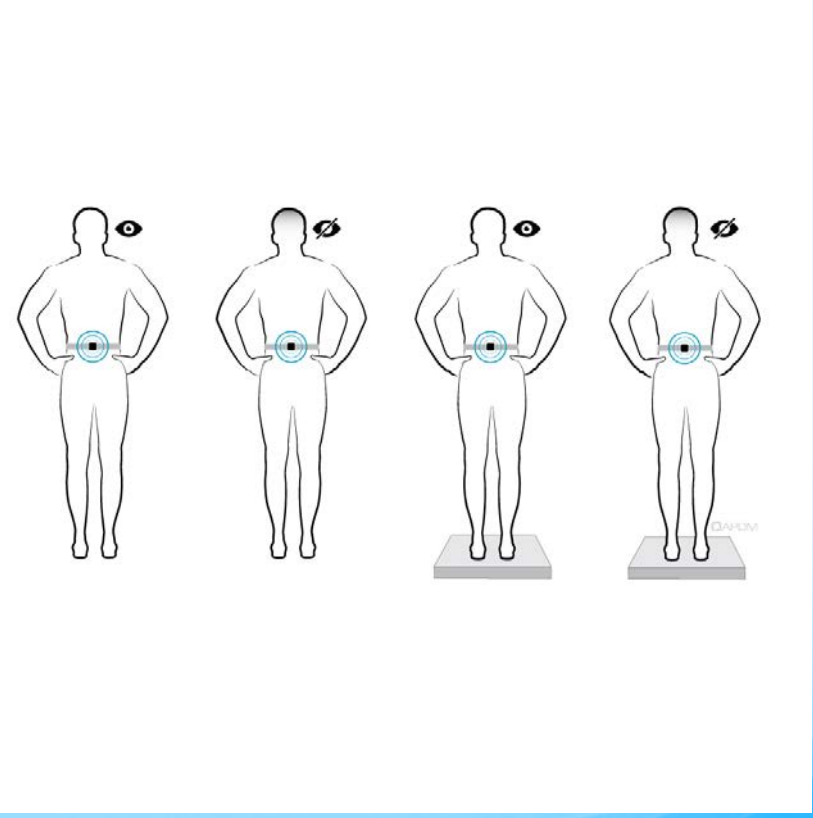
- Gait Velocity
  - *"The Sixth Vital Sign"*
- Clinical Test of Sensory Organization and Balance [CTSIB]
- Rhomberg Test
- Berg Balance Test
- Timed Up and Go [TUG]
- Dynamic Gait Index [DGI]

Gait Velocity



Balance Testing

- Clinical Test of Sensory Organization and Balance [CTSIB, CTSIB-M]
  - Stable vs Unstable surface
    - ~~PROPRIOCEPTION~~
  - Eyes Open vs Eyes Closed
    - ~~VISION~~
  - **Not tested in Modified CTSIB**
    - ~~*VESTIBULAR*~~



Exercises

Strength

+

Coordination of Systems

=

Balance

Hip Flexion Marching

Setup

Begin sitting upright in a chair with your feet flat on the floor.

Movement

Keeping your knee bent, lift one leg, lower it back to the ground, then repeat with your other leg. Continue this movement, alternating between each leg.

Tip

Make sure to keep your back straight and do not let it arch as you lift your legs.

Notes

Place hands on hips or "give yourself a hug" to increase challenge

Sit to Stand

Setup

Begin sitting upright with your feet flat on the ground underneath your knees.

Movement

Move your shoulders and head over your toes, bring your knees forward, and allow your hips to come of the chair, then push down equally into both feet to stand up. Sit back down and repeat.

Tip

Make sure to keep your weight evenly distributed between both legs, and try to keep your back straight throughout the exercise. Do not lock out your knees once you are standing.

Standing Hip Abduction with Counter Support

Setup

Begin in a standing upright position with your hands resting on a counter.

Movement

Lift your leg out to your side, then return to the starting position and repeat.

Tip

Make sure to keep your moving leg straight and do not bend or rotate your trunk during the exercise. Use the counter to help you balance as needed.

Toe Raises with Counter Support

Setup

Begin in a standing upright position with your hands resting on a counter in front of you.

Movement

Lift the balls of your feet off the ground. Hold briefly, then return to the starting position and repeat.

Tip

Make sure to maintain an upright posture and use the counter to balance as needed.

Standing Single Leg Stance

Setup

Begin in a standing upright position with your hands resting on a counter.

Movement

Lift one foot off the ground. When you are balanced, let go of the counter.

Tip

Make sure to maintain an upright posture and use the counter to help you balance as needed.

Lateral Weight Shift

Setup

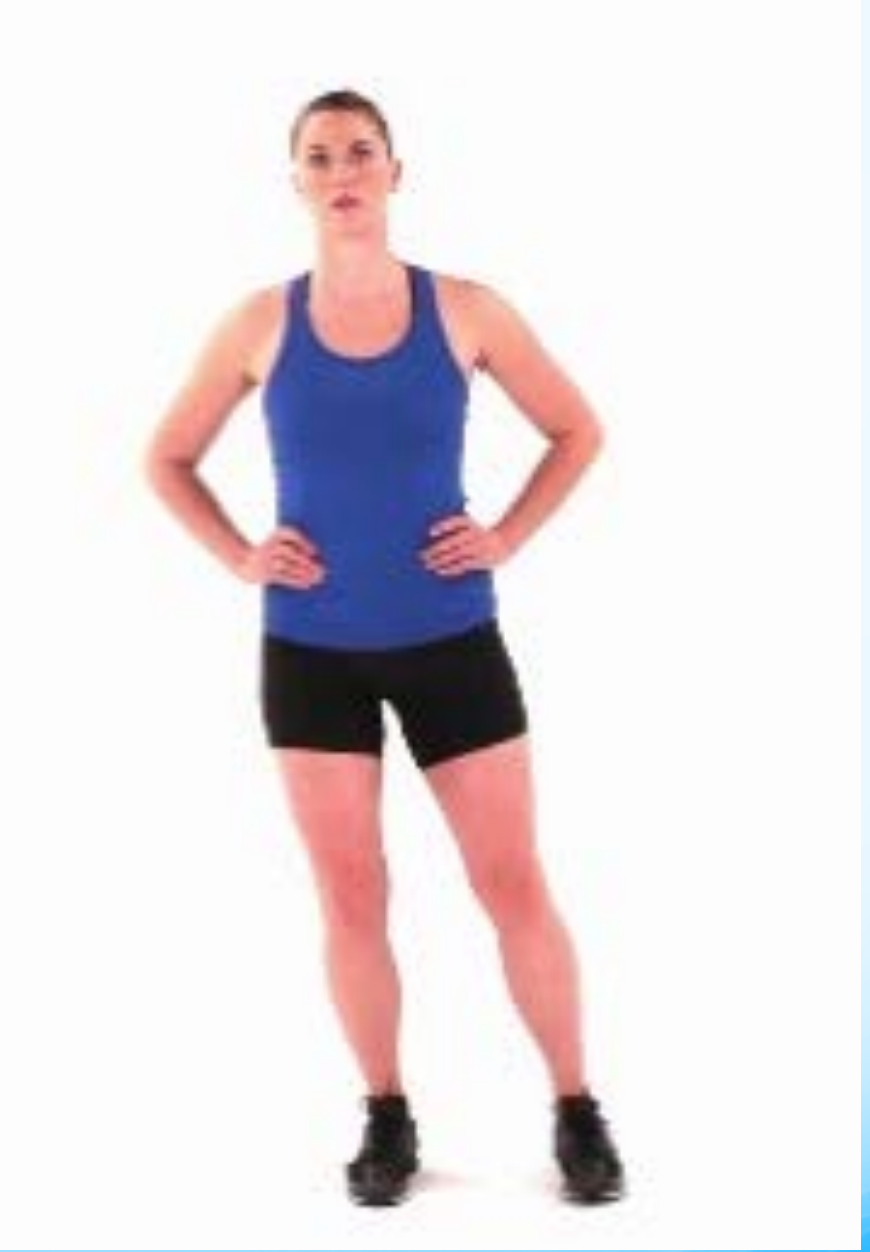
Begin standing with your knees slightly bent.

Movement

Slowly shift your weight back and forth from one side to the other.

Tip

Make sure to keep your back straight and try to keep your weight in your heels.



Anterior/Posterior Sway

Setup

Begin in a standing upright position in front of a chair with the backs of yours legs touching the chair.

Movement

Slowly shift your weight forward, hold briefly, then slowly shift your weight backward, hold briefly, and repeat.

Tip

Make sure to maintain your balance and keep your movements slow and controlled. Try to keep your heels and toes on the ground during the exercise.

Modified Tandem Stance

Setup

Begin in a standing upright position with your feet together.

Movement

Move one foot so that it is staggered approximately 3/4 of its length back from your other foot. Stay in this position and maintain your balance.

Tip

Try to keep your back straight and avoid moving your hips or trunk side to side during the exercise.

Questions?

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