

Balance includes the ability to stay upright, maintain positions, and react to forces that could cause you to fall. Balance is important for us to be able to move through our environment safely. Three systems help keep your balance:

- **Sensory system** (you may also hear this system called proprioception or somatosensory system)
 - sends your brain information about where body parts are in space and what type of surface you feel (smooth vs rough, flat vs uneven, soft vs firm, etc.)
- **Vision** - most people rely very heavily on vision for balance! This is why walking at night or low light environments can be more challenging. If your eyes aren't working together correctly, you may also experience double vision which can make it harder to stay balanced
- **Vestibular system** – This system has two important functions:
 - Provides information to the brain and muscles to help you maintain balance
 - Provides information to the brain and eye muscles to help you see clearly when your head is moving

The vestibular system is often affected with mild traumatic brain injury (mTBI) and concussion. People with mTBI or concussion who have changes in their vestibular system may experience:

- Dizziness with rolling over in bed, lying down, sitting up, standing up or walking
- Loss of balance frequently or loss of balance with specific activities or movements
- General dizziness
- Frequent falls
- Being unsteady with movement
- Vertigo - A sensation of feeling off balance that can make it feel like you are spinning, or the world is spinning
- Difficulty focusing vision during movement
- Nystagmus - Rapid involuntary movement of the eyes

Changes in the vestibular system can result in falls or decreased balance. This can cause:

- Injury to joints/muscles/bones
- Limited ability to engage in leisure activities
- Limited ability to return to work
- Increased need for help from others

Causes of Dizziness and Balance Disorders:

Vestibular Ocular Reflex (VOR)

- The VOR is responsible for the ability to see clearly when moving. Changes to this reflex after mTBI or concussion can cause dizziness with the following:
 - When walking or moving
 - Being in busy environments
 - When trying to read
 - With driving or riding in a vehicle



Benign Paroxysmal Positional Vertigo (BPPV)

- BPPV occurs when crystals located in the inner ear get knocked loose and move out of place. The dislocated crystals cause the person to feel as though they are spinning. This commonly occurs when getting in and out of bed or with moving your head. This sensation can last several seconds to a few minutes.
- BPPV is not life threatening and is one of the most common vestibular disorders.
- BPPV is usually successfully treated with different positioning techniques performed by a physical therapist or doctor.

Motion Sensitivity

- People sometimes experience dizziness that related to different movements. They may move very stiffly or slowly and avoid certain positions. Sometimes symptoms can occur with motion in the environment.
- After mTBI or concussion a person might experience motion sensitivity related dizziness, nausea, headaches or imbalance with the following:
 - Head and/or body movements
 - Walking and turning
 - Busy environments
 - Bright lights
 - Being a passenger in a car

Cervicogenic Dizziness

- Dizziness and/or lightheadedness can occur with neck pain, stiffness, or headache. This may happen with neck and head movements or holding the head in one position for a long time.

Other Factors that may cause dizziness

- Medications
- Metabolic changes
- Some cervical spine injuries
- Panic disorder or anxiety
- Migraines
- Blood pressure changes
- Other neurologic conditions

Treatment and Management Methods:

- Vision or vestibular ocular reflex (VOR) exercises
- Repositioning techniques for BPPV
- Habituation exercises to reduce sensitivity to movement
- Walking and/or balance exercises
- Education

Reference Site

You can read more information about Balance difficulty after brain injury provided by Traumatic Brain Injury Model Systems at:

<http://www.msctc.org/tbi/factsheets/Balance-Problems-After-Traumatic-Brain-Injury>





Additional Comments:

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