



Visual-Vestibular Coordination

The visual and vestibular systems share an inseparable neurological and functional connection. Together, they provide the foundation for skillful and comfortable movement through space and time as well as for efficient intake of visual information for learning. Although vestibular functions and oculomotor control are typically addressed in sensory integration treatment, the efficient coordination of these systems is more recently being targeted in treatment for enhanced functional visual skills. Your therapist here at OTA The Koomar Center (OTA) may be talking to you about incorporating such focused activities within treatment sessions and within a home program.

The **vestibular** system is often referred to as the movement or balance system. The receptors are located within the inner ear, which respond to gravity and detect motion and change of head position. They tell us where we are in relationship to gravity, if we are moving or at rest, and our speed and direction of movement. The vestibular system is a powerful integrator that interacts with all other sensory systems. It most noticeably impacts our posture, balance, muscle tone, and bilateral coordination.

The **visual** system is more than just eyesight, or the ability to see clearly. It is also our ability to understand what we see. It is estimated that at least 75% of learning occurs through visual pathways. If an individual is experiencing any visual difficulties, learning will most likely be impacted.

For efficient oculomotor function, **complex integration** of many sensory systems must occur. According to Josephine Moore, the vestibular system is like a tripod stand that holds a camera, in that it helps hold the head stable so that the eyes can focus on an object. It contributes to bilateral integration which is important for simultaneous functioning of the two eyes together and smooth eye movements across the visual midline. Proprioceptors in the neck, eyes, and body help to coordinate movements to orient the head to the task at hand. All of these inputs together, especially the coordination between the visual and vestibular systems, are important in providing a foundation for the timing and spatial orientation of our movements and for security and comfort to navigate across environments.

Problems with Visual-Vestibular coordination for a child may include:

- Has difficulty going up or down stairs
- Gets car sick frequently or generally dislikes rides in the car
- Delays with reading and writing
- Difficulty with gross motor skills such as riding a bike, ball skills, running, or jumping

Problems with Visual-Vestibular coordination for an adolescent may include:

- Difficulty with handwriting or reading
- Hard time learning to drive
- Taking a long time reading or writing schoolwork
- Difficulty copying from the board

Problems with Visual-Vestibular coordination for an adult may include:

- Difficulty driving (reading road signs, merging on the highway)
- Needing to spend a lot of time and energy getting organized
- Feeling uncomfortable if not in the front seat while riding in a car.
- Difficulty navigating through grocery store, department store or mall

Several activities are frequently used to improve the coordination of the visual and vestibular systems and graded to the individual's particular level and need. One such activity is the Astronaut Training Program protocol. This activity involves rotary stimulation in sitting and side lying positions to elicit reflexive eye movements. Such rotary movement helps to "warm-up" the eyes for focused visual activities. Another activity is the Infinity Walk, in which the individual walks in an infinity or lazy 8 pattern while engaging in motor, sensory, or cognitive challenges. This activity is a powerful sensory integrator that can strengthen communication between both sides of the body. Your therapist can further individualize these activities to match an individual's particular needs.

Information summarized from: Kawar, M. (2020). "Astronaut Training Program" and "Infinity Walk" in A.C. Bundy & S.J. Lane (Eds.), Sensory Integration Theory and Practice, 3rd ed. (Philadelphia: F.A. Davis Company), pp. 452-461.

Resources:

www.covd.org – College of Optometrists in Vision Development, resource for vision therapists for vision and learning challenges

www.pavevision.com – Parents Active for Vision Education explores the relationship between vision and learning

www.infinitywalk.org

Hannaford, C., *Smart Moves: Why Learning is Not All in Your Head, 2nd edition.* (Salt Lake City, UT: Great River Books, 2005)

Sunbeck, D. *Infinity walk: Preparing your mind to learn.* (Rochester, NY: Infinity, 1991)

Thaut M, *Rhythm, Music, and the Brain: Scientific Foundation and Clinical Applications* (New York, NY: Routledge, 2007)