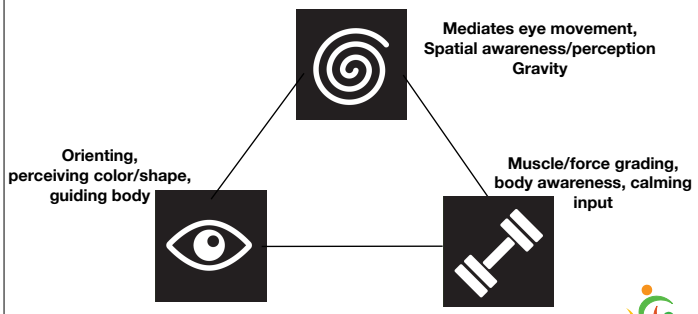
Visual-Vestibular-Somatosensory Triad



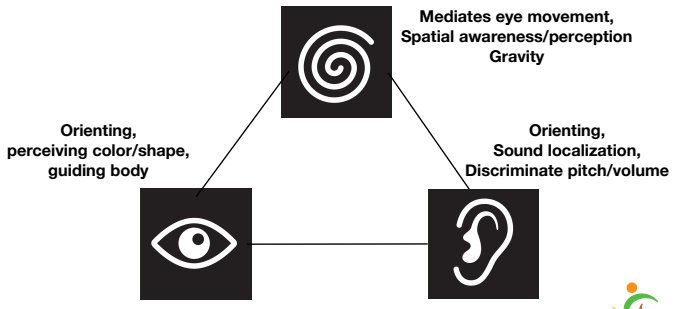
Vestibular-Ocular-Cervical Triad

Vision: Provides information about orientation in space, detection of movement, learning details about the environment

Cervical Receptors in the Neck: link between the rest of the body and the head enabling the body to function as a whole

Vestibular:
Responsible for sense of gravity, space and speed/direction of movement
(receptors in the inner ear)

Visual-Vestibular-Auditory Triad



Asthenopia in Children
Digital Eye Strain/Computer Vision Syndrome

19.7% (12.4–26.4%). Vilela, M. A., Pellanda, L. C., Fassa, A. G., & Castagno, V. D., 2015.

- Symptoms: Itching, Redness, tearing, visual fatigue, dry eye, headache, light sensitivity, neck strain (Sheppard, A. L., & Wolffsohn, J. S. (2018)
- Behaviors: Eye rubbing, excessive blinking, difficulty sustaining visual focus, fatigue
- Impact: Blurred vision, difficulty focusing, pain/discomfort

Vilela, M. A., Pellanda, L. C., Fassa, A. G., & Castagno, V. D. (2015). Prevalence of asthenopia in children: a systematic review with meta-analysis. Jornal de pediatria, 91(4), 320–325. https://doi.org/10.1016/j.jped.2014.10.008

Convergence Insufficiency and Reduced Accommodation

"About 80% of children with learning disability are shown to be affected with accommodation and vergence anomalies that include convergence insufficiency (CI), reduced amplitude of accommodation (AOA), reduced accommodative and vergence facility, low accommodative convergence/accommodation (AC/A) ratio and reduced fusional ranges."

Hussaindeen, J. R., Shah, P., Ramani, K. K., & Ramanujan, L., 2018

Hussaindeen, J. R., Shah, P., Ramani, K. K., & Ramanujan, L. (2018). Efficacy of vision therapy in children with learning disability and associated binocular vision anomalies. *Journal of optometry, 11*(1), 40–48. https://doi.org/10.1016/j.optom.2017.02.002

Learning impact

Adolescent Brain Cognitive Development (ABCDstudy.org)

11,874 youth, ages 9–10, participating in the study, including 2,100 young people who are twins or triplets. All will be followed through young adulthood.

Year One Findings:
MRI's found significant differences in the brains of some kids who use smartphones, tablets, and video games MORE THAN 7 HOURS PER DAY.

Premature thinning of the cortex. That's the wrinkly outermost layer of the brain that processes information from the five senses.

Kids who spend MORE THAN TWO HOURS PER DAY on screens got lower scores on thinking and language tests.