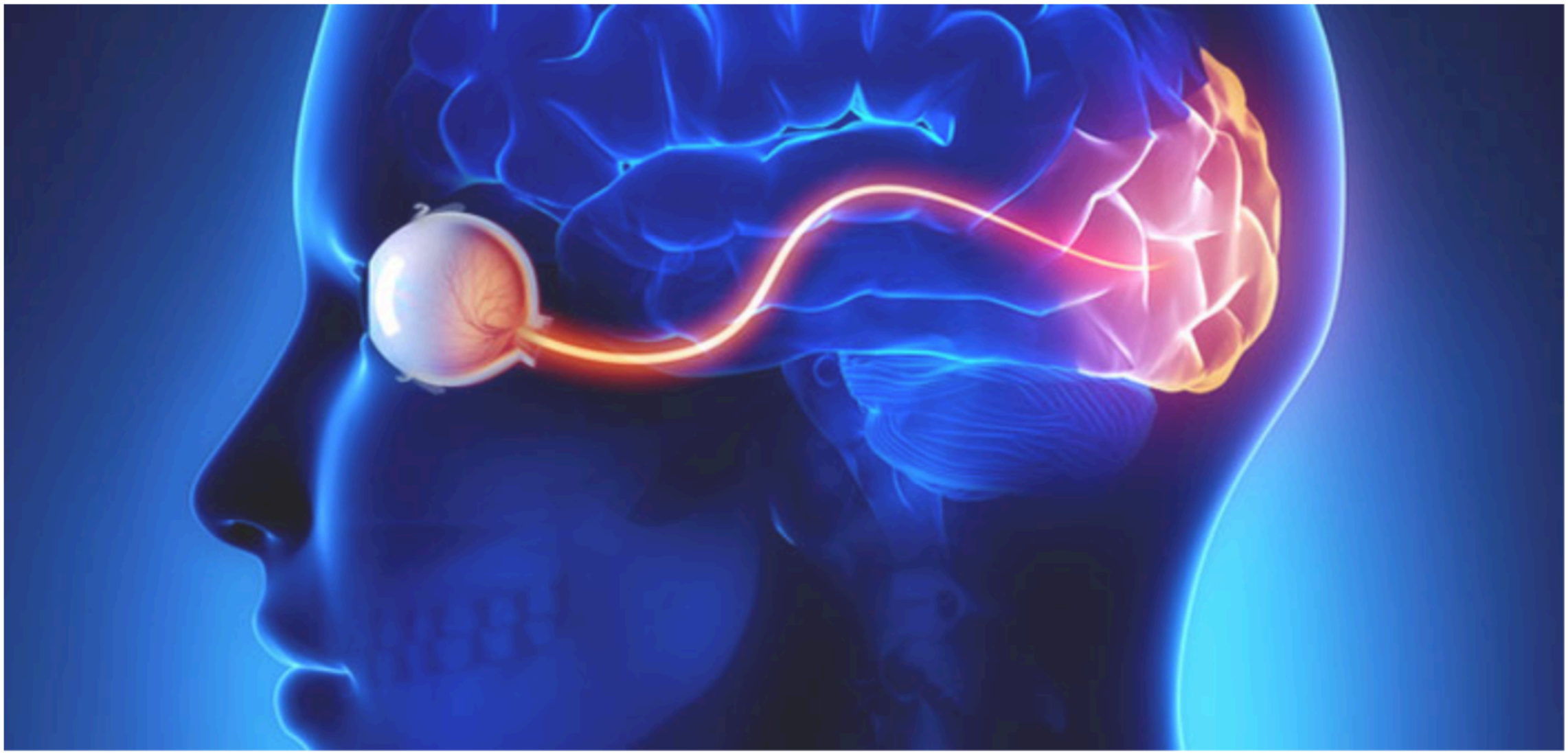
We see with our brain, not our eyes. As much as 50% of the brain is involved with vision and when it comes to academics, vision pertains to how our eyes track words on a page and countless other activities related to how we read, write and absorb information.

Neurovisual abilities can be developmentally underdeveloped or disrupted and also caused by trauma like concussions. Vision is highly trainable.



(Photo credit: CLIPAREA.com/Folotia)

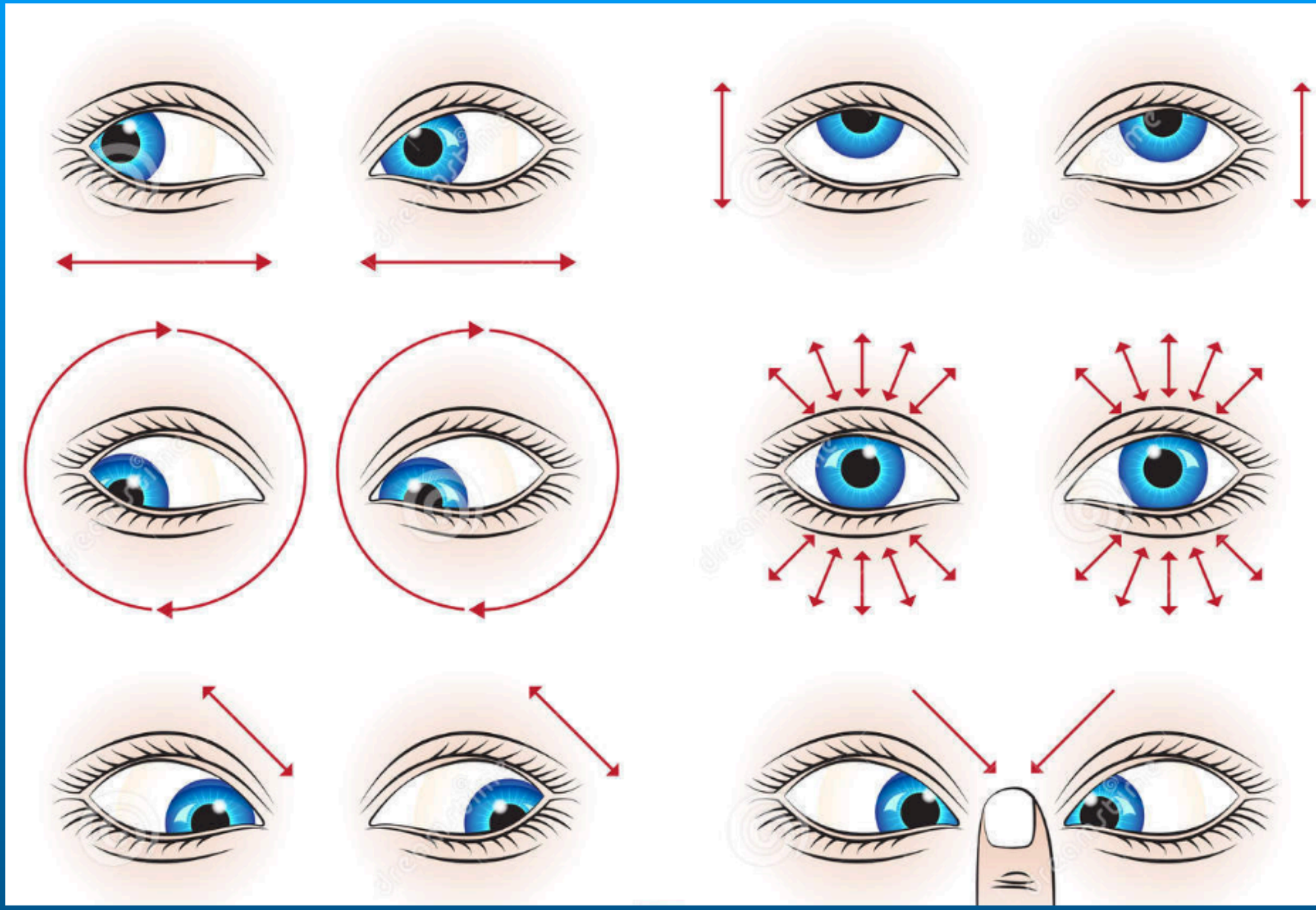
Understanding Visual Input, Put-Put, and Output

To better understand how to fix visual problems, we need to understand the visual system. For sake of discussion, the visual process can be broken down into the following categories:

1. visual input
2. visual processing
3. visual integration skills

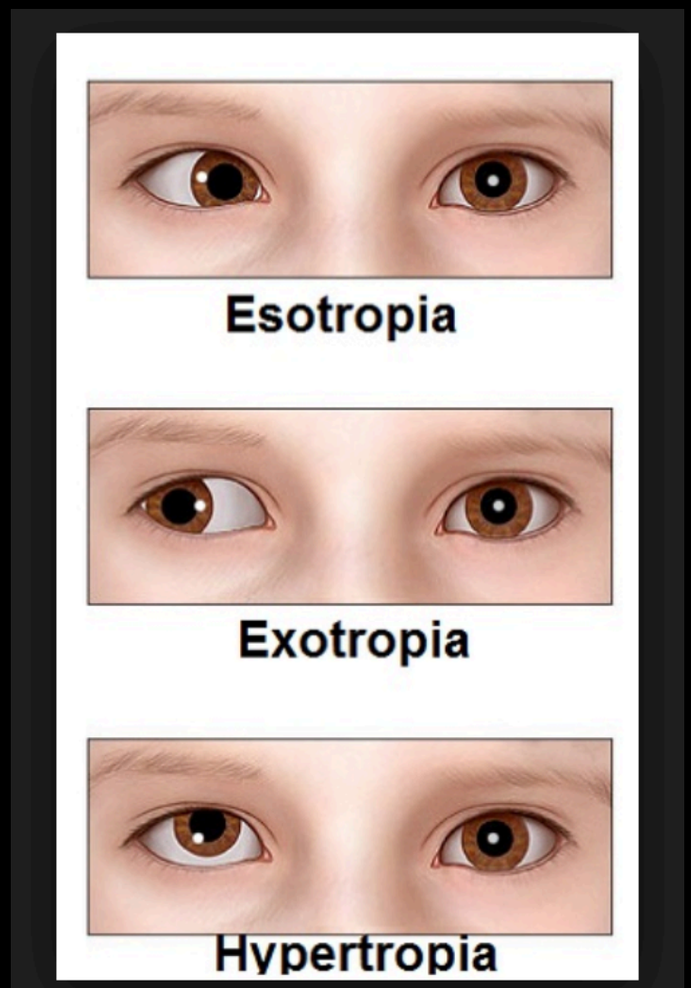
We can break down visual skills for the sake of definition, however, it is important to realize that these skills coordinate together almost simultaneously. The neural pathways of vision are highly interconnected, which is why 2/3rds of the brain pathways are involved with vision, while the other 1/3 is all the other senses combined.

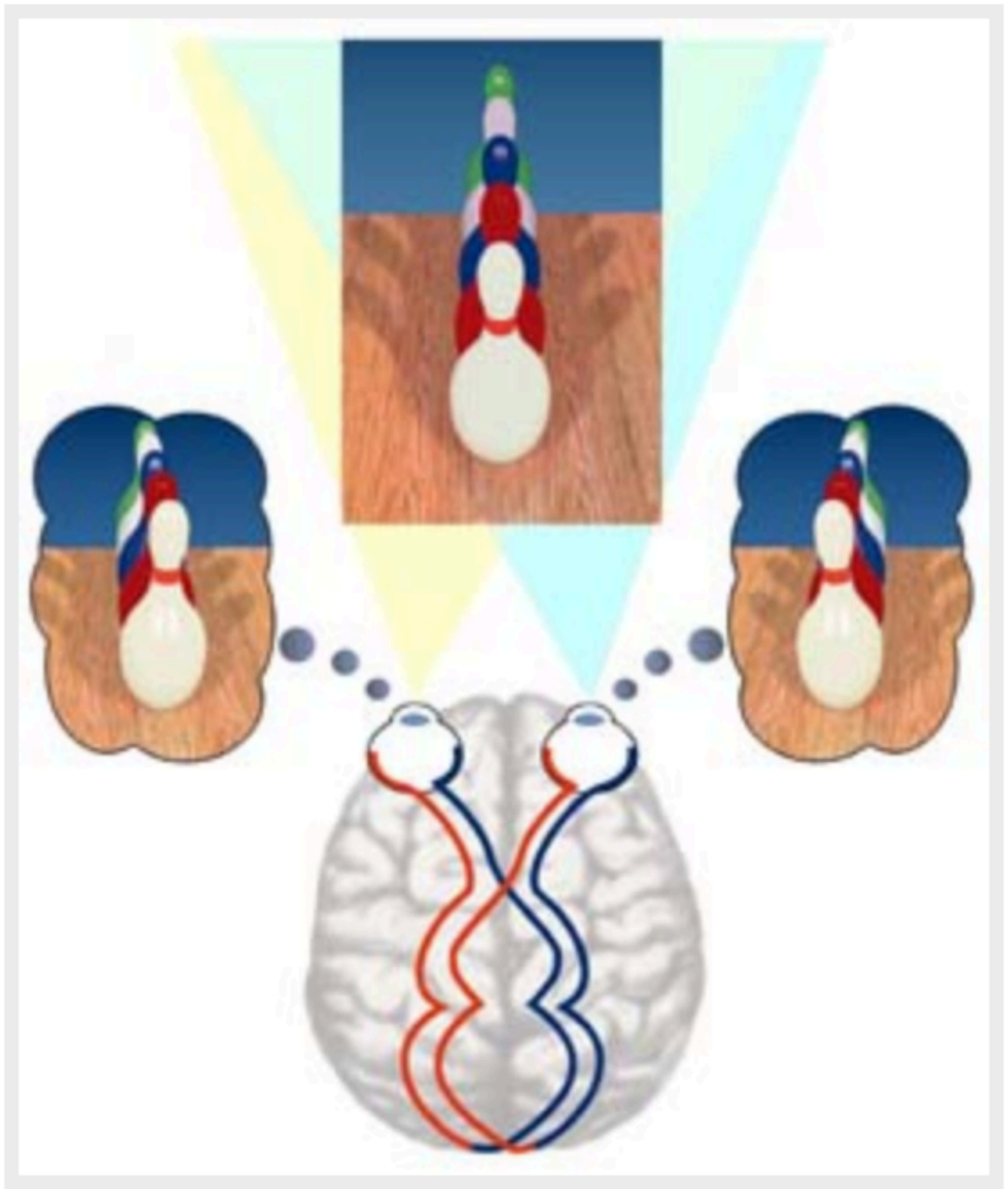
1	**Eye Movement Control**	*The ability to move both eyes together to point at an intended target or follow along a path, like a line of text*
2	**Simultaneous Focus at Far**	*Forming a clear image of something in the distance*
3	**Sustaining Focus at Far**	*Keeping an image of something in the distance clear*
4	**Simultaneous Focus at Near**	*Forming a clear image of something close to the eyes*
5	**Sustaining Focus at Near**	*Keeping a clear image of something close to the eyes*
6	**Simultaneous Alignment at Far**	*Lining up both eyes at the same point the distance*
7	**Sustaining Alignment at Far**	*Holding both eyes lined up at the same point in the distance*
8	**Simultaneous Alignment at Near**	*Lining up both eyes at the same point up close*
9	**Sustaining Alignment at Near**	*Holding both eyes lined up at the same point up close*
10	**Central Vision (Visual Acuity)**	*This is where "20/20" vision comes in!*
11	**Peripheral Vision**	*Being able to see what's on either side of you while your eyes are pointed forward*
12	**Depth Awareness**	*Being able to tell that things are further away or closer up than each other (also know as depth perception)*
13	**Color Perception**	*Being able to tell different colors apart (if you are not color-blind)*
14	**Gross Visual-Motor**	*Moving yourself through space without bumping into things by using information from your vision*
15	**Fine Visual-Motor**	*Writing, sewing, texting, and doing other small and close-up activities with accuracy by using information from your vision*
16	**Visual Perception**	*Being aware of your environment and what is going on around you in your visual field (the area you can see)*
17	**Visual Integration**	*Bringing together your vision and your other senses to accomplish complex tasks, like reading while walking a balance beam*



Vergence is the motor activity that allows us to move our eyes to aim them at a target. Binocularity comes from the sensory ability to interpret as one image. Without optimal binocularity it's difficult to judge depth and spatial awareness.

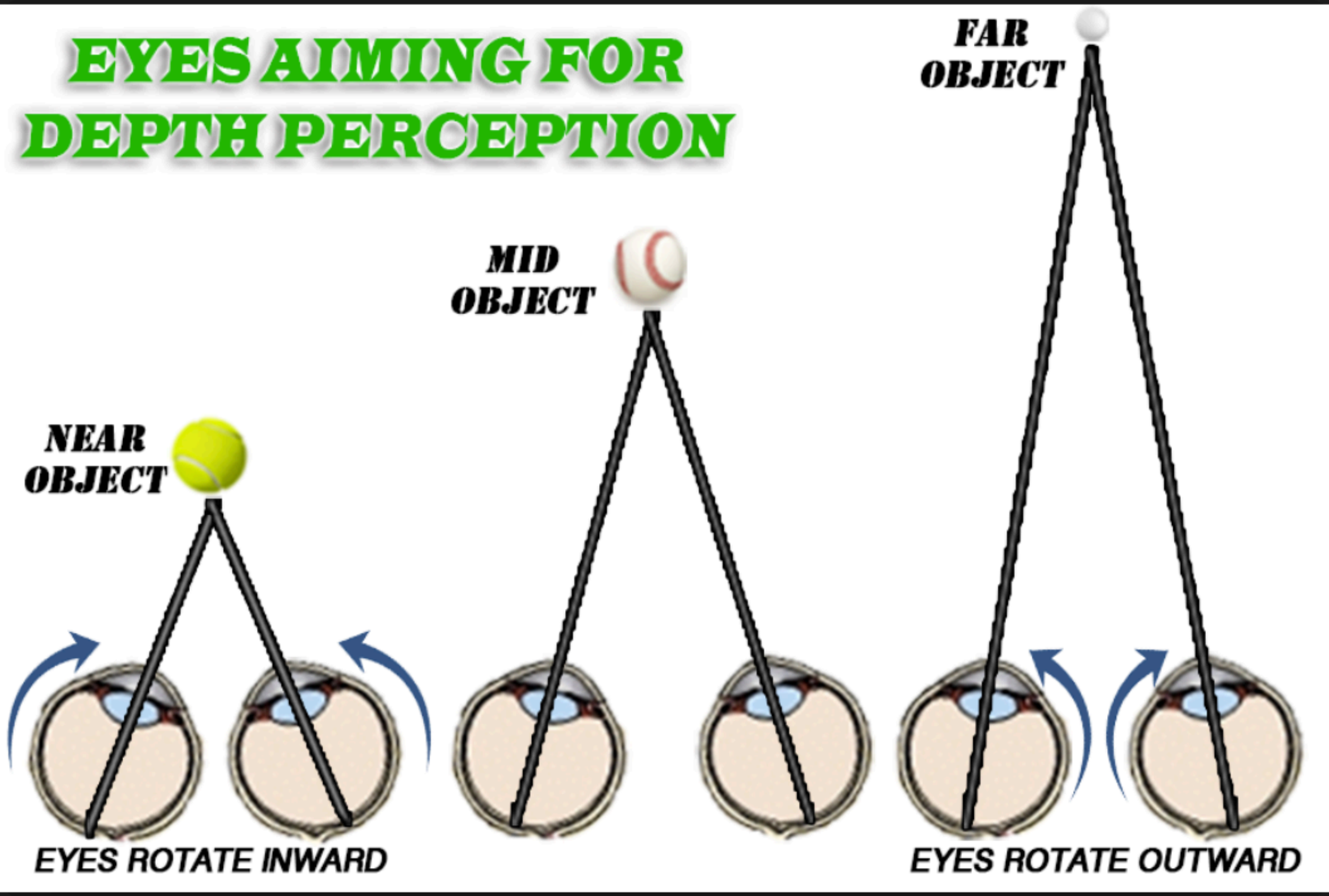
Strabismus us a problem with eye alignment in which both eyes aren't looking at the same place at the same time intermittently or chronically. Amblyopia is a problem with alignment and acuity where even with prescription glasses a person cannot see an image clearly with one or both eyes. Both are functional vision problems resulting from compromised eye teaming.



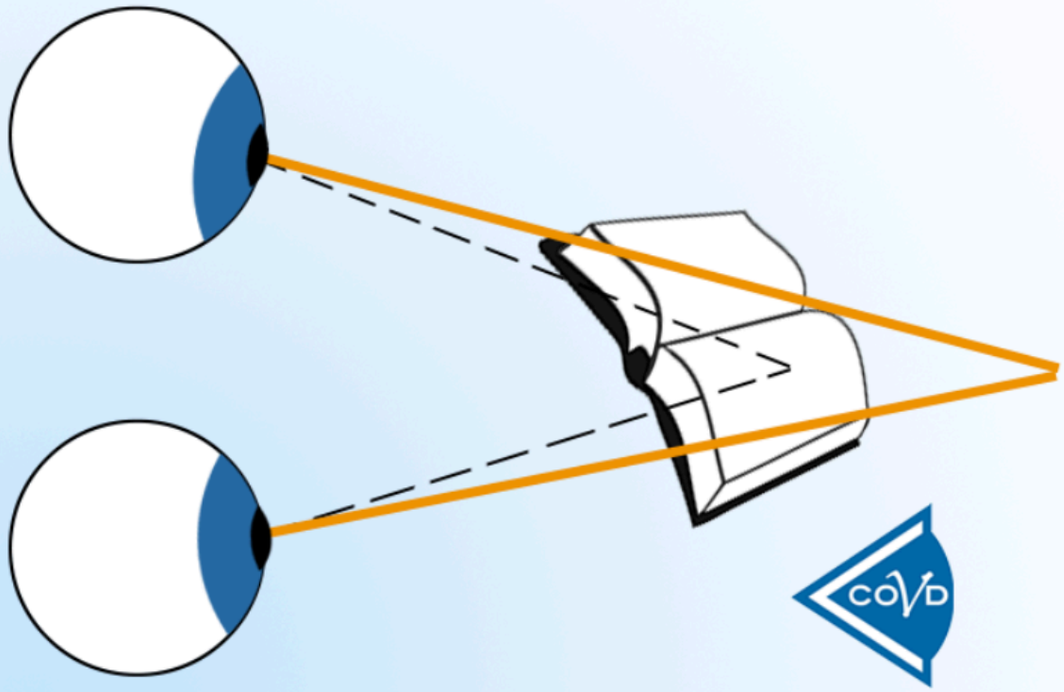


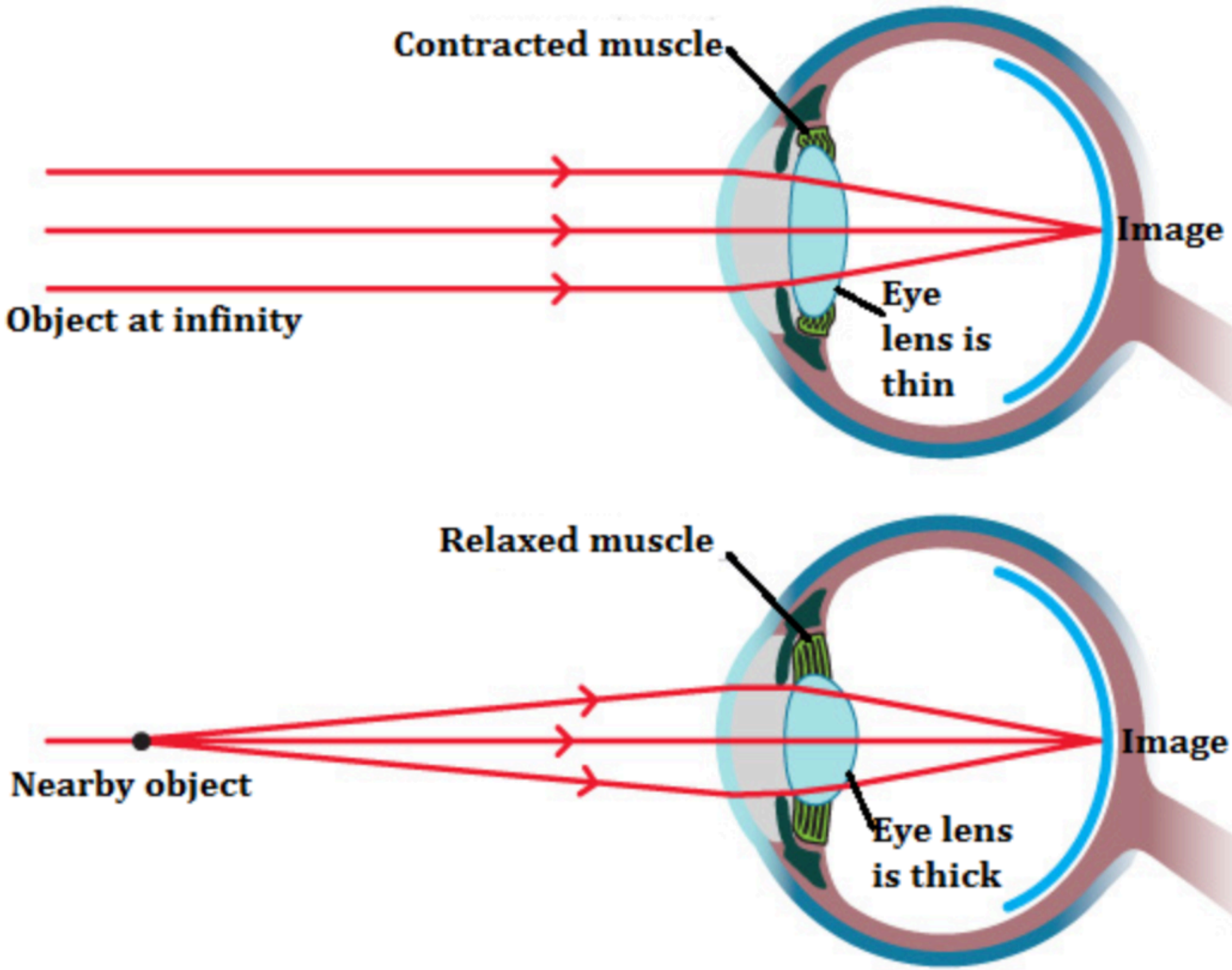
The ability of both eyes to work together to form a fused image with depth

EYES AIMING FOR DEPTH PERCEPTION



Convergence Insufficiency



College of Optometrists
in Vision Development

The curvature of the eye lens can be adjusted by the ciliary muscles. This changes the focal length of the lens. The ability of the eye lens to adjust the focal length (converging power) is called accommodation.
To see distant objects, the muscles relax and the lens becomes thin. This increases the focal length, thereby enabling us to see distant objects.
To see nearby objects, the muscles contract and the lens becomes thick. This decreases the focal length, thereby enabling us to see nearby objects.