Visual Strategies To Aid In Recovery From Brain Injury

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Primary, secondary and tertiary pathways originate from the eyes and course through the brain. Brain injury can therefore cause disruption in the perceived visual field, attention to the visual field, control of the extraocular muscles of the eyes, and to perception of visual space. Disruption of the visual perception of space can cause significant disruption of visually guided movement, and balance. It also interferes with the ability to contend with emitted light as well as reflected light.

A visual assessment is the ideal first step to determine if one is prepared to engage in our dynamic three-dimensional visual-space world. Rehabilitative Optometrists are vision professionals who work specifically in this area. Vision assessments after brain injury are designed to learn of ones visual preparedness (physiological, perceptual and cognitive) for the demands of acquiring and expressing visual information during the activities of daily living. It is also designed to determine what therapeutic interventions might be necessary to eliminate any physical symptoms that have followed a brain injury. This is done by evaluating the status of ones eye alignment, visual fields and how well the visual system processes information and guides the movement of the body. It also helps determine the therapeutic avenues available to support visual recovery. In addition, theses evaluations assess eye health, visual acuity, color vision depth reception and refractive status.

Glasses should be used if they are prescribed by your Rehabilitative Optometrists. Glasses may be required to compensate for any refractive conditions or because of the need for reading glasses. “Yoked prism” to aid in balance and movement may also be prescribed. Yoked prism can re-align the functional midline, and provide for more stability when walking by shifting perceived space through the x, y and z-axis.

Glasses also often include a specific tint to aid in the regulation of light entering the visual system. Modifying the spectral nature of light that enters the visual system can alter an individuals’ ability to visually attend to written information. It can provide a sense of spatial organization of the page, which enables many people to track and gather information from a book much more easily. It can also improve visual comfort in otherwise challenging visual environments, such as fluorescent lighting conditions or “busy” visual environments (shopping, driving, etc.). Precision colored tints in glasses often provide relief from visual tension and visual headaches as well.

Another unique opportunity for those with a brain injury who also have lost the left or right side of their visual field is the use of “field awareness prism.” A “field awareness prism” allows for more visual awareness of targets in the otherwise blind field, and can often provide improved mobility and confidence in dynamic three-dimensional space.

There are three general approaches to helping survivors' function despite acquired difficulties with the visual system: compensatory, accommodative and therapeutic. Compensations 'go around' the problem. Accommodations minimize the impact of the problem. A therapeutic approach is designed to eliminate the problem.

Compensations are appropriate if there is no hope of treating the dysfunctional abilities. Accommodations can be eliminated as one develops improved abilities over time. Environmental accommodations are usually appropriate. From an Accommodations standpoint, survivors usually will benefit from some of the modifications listed below. These modifications are designed to allow for visual information to be more accessible and with less stress.

1. To improve efficiency when reading, read while using a sloped reading surface (approximately 22 degrees). This will help improve posture and encourage a more appropriate visual reading distance.

2. The eyes should be no closer to any visual information (books, homework, etc.) than the distance from the elbow on the page, to the middle knuckle under the chin (Harmon distance).

3. Make sure that reading light does not reflect off the surface of the page (or computer screen) into the eyes. You can check this by putting a mirror on the surface of the paper to see if the lamp can be seen in the mirror. If so, move the lamp or the reading material.

4. For students, and if possible, move closer to the front of the classroom. If at all possible move your seat so that the view of the board is close to, if not directly in front of you. Try to ensure that there is no glare reflecting off of the board or your desk into your face, especially from over-head projectors.

5. Long visual work periods (more than 20 minutes) can cause stress, fatigue and difficulty with attention. Until therapy provides resolution of these symptoms, allow for regular vision-breaks that occur every 20 minutes, looking away at least 20 feet for at least 20 seconds. We call this the "20/20/20 rule."

6. Reduce conflicting peripheral visual and auditory stimulation. Removing materials unrelated to the task may increase visual attention.

7. Reduce "screen time" (television, computer and video games) to one hour per day during the week, and no more than 2 hours per day on the weekend. Also, keep the viewing distance from the television to be no closer than 8 feet, 2 feet from the computer, and 16 inches from hand-held video games.

8. If possible, eliminate "visual crowding." Visual crowding can be a real problem for many people. Try to read from print that is widely spaced (as you can see here) and in a large font. Fonts like Arial or Times New Roman are sometimes easier to read.

9. Also, explore which font style you seem to like most. Experiment with sans serif type or those with a serif. This section is printed in 14 pt Arial font, which is a sans serif font, with double spaced lines.

From a therapeutic standpoint, Vision Rehabilitation is often an important part of the recovery plan. Optometric Vision Therapy, or Vision Rehabilitation involves what is referred to as neuro-adaptive learning and perceptual learning. Neuro-adaptive learning arranges for one to learn how to coordinate the input into the brain by learning to coordinate the muscles of the eyes. Once one learns to do this efficiently, then therapy progresses to perceptual learning; that is, learning how to accurately perceive the information that arrives from the eyes to the brain.

Neuro-adaptive learning and perceptual learning require integrating, matching and coordinating information from all of the senses. This is done by engaging in activities that surround linear, spatial and temporal pattern recognition and organization. Finally, visual cognition (attention, thinking, and working memory) is developed by coordinating these previously learned skills with more complex language, and non-language-based activities.

Hopefully this provides a structure in which visual recovery can be organized: Initial evaluation by a rehabilitative vision specialist, Modifying the visual environment, engaging in Vision Rehabilitation.

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