

One of the most important areas of a successful activities program is ocular motor. It is one of the easiest areas of the visual system to train and it has the greatest impact on school performance, especially in reading. Ocular motor consists of control and coordination of eye movements. Deficits can severely impair a child's ability to effectively scan his environment, and in turn, devastate him functionally (Wolff, 1973). Ocular motor dysfunction is one of the main causes of inefficient reading and can directly affect reading speed. In my opinion, no other area can have as drastic an effect on school performance, and as a result have as positive an effect on school performance when it is remediated.

Eye movements are the fastest and most frequent movements made by the human body. The eye movement control system is complex, sophisticated, and advanced. It is erroneous to solely equate eye movements with vision. The function of eye movements goes well beyond vision and reflects higher brain processes. In order to localize an object in space, the central nervous system (CNS) must use a combination of visual (retinal) information and a knowledge of the position of the eye in its orbit. Part of this is based on sensing the motor commands to the ocular muscles and part on sensing proprioceptive inputs from the ocular muscles themselves. For large ocular deviations, ocular muscle proprioception may account for 32% of the information used to sense eye position (Gauthier, Year).

The ocular motor system directs both eyes toward the object to be viewed. Eye movements are controlled by three pairs of muscles, the medial and lateral recti, inferior and superior obliques, and inferior and superior recti. Medial and lateral recti of each eye contract reciprocally to move the eyes from side to side. The superior and inferior recti move the eyes up and down. The obliques are responsible for rotating the eyeballs to keep the visual image upright. The ocular motor system places and holds the eyes on target by six classes of movements: fixations, vestibular, optokinetic, smooth pursuit, saccades, and vergence.

1. *Fixations*: holds the image of a stationary object on the fovea.
2. *Vestibulo-ocular reflex*: holds images of the seen world steady on the retina during brief head rotations.
3. *Optokinetic*: holds images of the seen world steady on the retina during sustained and low frequency head rotations gaze shifting.
4. *Smooth pursuit*: holds the image of a moving target on the fovea.
5. *Saccades*: directs images of eccentrically located objects of interest onto the fovea.

6. *Vergence*: moves the eyes in opposite directions so that images of a single object are placed simultaneously on the foveas and the images of both eyes "fuse" into one image.

Oculomotor stress symptoms include intermittent blurred vision, diplopia, visual fatigue, orbital aching, eye burning, and headaches. The visual subjective symptoms include:

1. Intermittent and/or sustained blurred vision.
2. Intermittent and/or sustained diplopia, trembling visual images, problems in following, and/or shifting lines during reading.
3. Eyes burning, tearing, orbital pain, visual fatigue, headaches, aching neck/shoulders, and/or nausea (Oslo, 1989).

When we work with children, we are mainly concerned with three ocular motor areas. These are smooth pursuit, saccades, and vergence. It is important that we remember that the sole purpose of the ocular motor system is to keep the image that we are looking at on both foveas at the same time. If this doesn't happen, then we get the symptoms mentioned above. At this point, before we continue, I think that we need to have a good understanding of the anatomy of the eye, especially the foveal area.

Light enters our eye through the cornea, which is the main refractory part of the eye. An irregularly shaped cornea is the main cause of astigmatism. After the cornea, the light passes through the pupil and through the lens. The lens of the eye is a transparent biconvex body of crystalline appearance (crystal clear). The color of the lens changes with age. In the infant and young adult, it is quite colorless. After about 35 years, the central portion gets a definite yellow tinge, which becomes darker and more extensive as time goes on. In the older person, the lens often has an amber color (Wolff, 1973). If there is an opacity in the lens, this is called a *cataract*. The diameter of the lens is 9 to 10 mm, and its thickness (from 4 to 5 mm) varies greatly as the eye is focused for distant or near objects (accommodation) (Zoltan, 1996). Light then passes through the vitreous humour. This is a transparent, colorless, gelatinous mass of a consistency somewhat firmer than egg white which fills the posterior four-fifths of the globe (Wolff, 1973). The light then hits the *retina*, which is the posterior portion of the eye (Figures 4-1 and 4-2). The image that hits the retina should be a sharp image. It is the responsibility of the anterior position of the eye to make the image as sharp as possible (the cornea and lens). This image is the adequate stimulus that excites the sensory receptors of the retina. The differences in light intensity of the image produce different levels of pigment breakdown to which the photoreceptors respond