

Vestibular Systems Evaluation Tools (Real Eyes) Dr. John G. Schoenenberger

In the study of clinical neurology, one of the most important diagnostic and treatment areas is eye function. I spend a great deal of time in seminars, reading and researching at home, and in the office with patients learning about the function of the muscles of the pupils and the muscles which move the eyes.

There is an instrument developed for and used by medical specialists in the field of vestibular diagnosis and rehabilitation. It is an infrared camera mounted in opaque goggles which resemble a diving mask called “**Real Eyes**”. Using this instrument, both pupillary and ocular function may be monitored on a large screen when one eye (the "slave" eye) is filmed as the other eye (the "master" eye) is put through various parameters of testing.

In clinical neurology it is a great tool in discovering and creating new ways to better understand nervous system function in our patients. Many autonomic, reflex and volitional functions may be examined. Because Chiropractic Neurology offers a paradigm of individualized neurologic treatment and rehabilitation, the more we can understand about the health of various pathways and pools of neurons within an individual patient's nervous system, the better we may design effective treatment plans.

And while we may use this camera in many different ways, the specific windows we use for a given patient will be unique to him or her. We may notice something as we watch the monitor which will lead us to examine him or her in ways appropriate to his or her own function.

We have the option of filming either eye. The pair of goggles has an aperture on each side which may be opened or closed. When we film one eye, the other eye may be exposed to light or not, depending upon whether its aperture is open or closed. I first like to examine each pupil as the other eye is exposed to light. I look at the slave eye for pupil shape, location, size and movement. I introduce light from different directions, often of different colors, and look for changes in pupil constriction, tearing, head position and movement. Then I ask the individual to look in different directions which correspond with the function of specific eye muscles as well as the functions of certain reflex pathways associated with labyrinthine activation. In these movements I look for the ability to move the eyes, the ability to hold the

eyes in position, and any changes in the pupil size or tearing of the eye during this activity.

I will then ask the individual to follow an object, such as my finger, as I move it in different directions, at different speeds, and I continue to observe the same parameters. Then I will move an **optokinetic tape** in a lateral direction and in a vertical direction and look at the pursuit and saccadic refixation activities.

Following this, I will close the aperture and watch the function of the slave eye when the other eye is not fixed on any object. We passively move the patient's head in different directions and look for the **vestibulo-ocular reflex**. I like to compare passive movement with the patient's ability to actively perform the same movements. We may also stabilize the patient's head and just move the body using a swivel chair. We generally will monitor the eye while we swivel the entire body, head and torso together, often doing this with the eyes held in specific positions. We may compare the eye function during swiveling without fixation of the master eye with the same swivel as the patient is asked to look at his or her thumb during the swivel activity.

There are other specialty tests, such as standing, walking, caloric stimulation, reading, answering specific questions, and more, which provide information about the various portions of the nervous system as seen in the eyes. We monitor tissue oxygen and heart rate as we do some of these activities to ascertain that we are neither fatiguing the patient, nor providing an unwanted neurologic input.

If we determine that a function is not optimum for that patient, we have the option of providing some form of therapy and monitoring its effectiveness. This is one of the best ways to use this equipment. The decision about the specific stimulation we provide is made by our observations not only of the eye function, but also the function of the nervous system as determined by a complete neurologic examination. We may treat the patient with a manipulation, or ask the patient to do a specific exercise, provide some visual or auditory stimulation, etc. Then, while we are doing this we may observe the effects on the nervous system as they occur in the eyes.