Binocular Vision and Mild Traumatic Brain Injury

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The primary cue to depth is binocular disparity. The images from the eyes must be precisely overlapped quickly and automatically; this is called fusion. The brain must then create the appearance of a depth field from the range of fused objects of varying binocular disparities. This is called stereopsis. Stereopsis is the visual equivalent of stereophonic sound.

Patients with mild traumatic brain injury routinely show severely impaired fusion and stereopsis. They may also experience accommodative disorders, meaning that one or both eyes fail to adjust rapidly to different viewing distances. Patients experience a range of symptoms from "eye socket" headaches and impaired ability to judge distances to frank diplopia - double vision - while reading or looking at nearby objects. The most common symptom is that the world loses its beauty and appears flat, one thing "stuck" on the next, much the way a stereo system sounds if switched to "mono."

Data will be presented on MTBI patients with these impairments and on their subsequent recovery of binocular visual function with a combination of orthoptic visual therapy and neurotherapy. Visual therapy is supervised by a developmental optometrist. Patients receive guided practice with a variety of binocular visual stimuli, gradually extending their ability to create normal fusion and stereopsis. Accommodative disorders can be treated through a combination of proper lenses and training procedures.

The recovery of visual function is often rapid (10-20 sessions) when visual therapy is coupled with neurotherapy. Improving binocular vision is separate but complementary to improving memory, concentration and multi-tasking abilities. The improvement in vision causes a positive effect on a wide range of symptoms, including affect and attention. Patients report improved mood, confidence in spatial judgments and a great sense of relief and amazement that they can see in "3-D."