

A MAGNETOENCEPHALOGRAPHIC INVESTIGATION OF VISUAL INFORMATION PROCESSING IN IRLLEN'S SCOTOPIC SENSITIVITY SYNDROME

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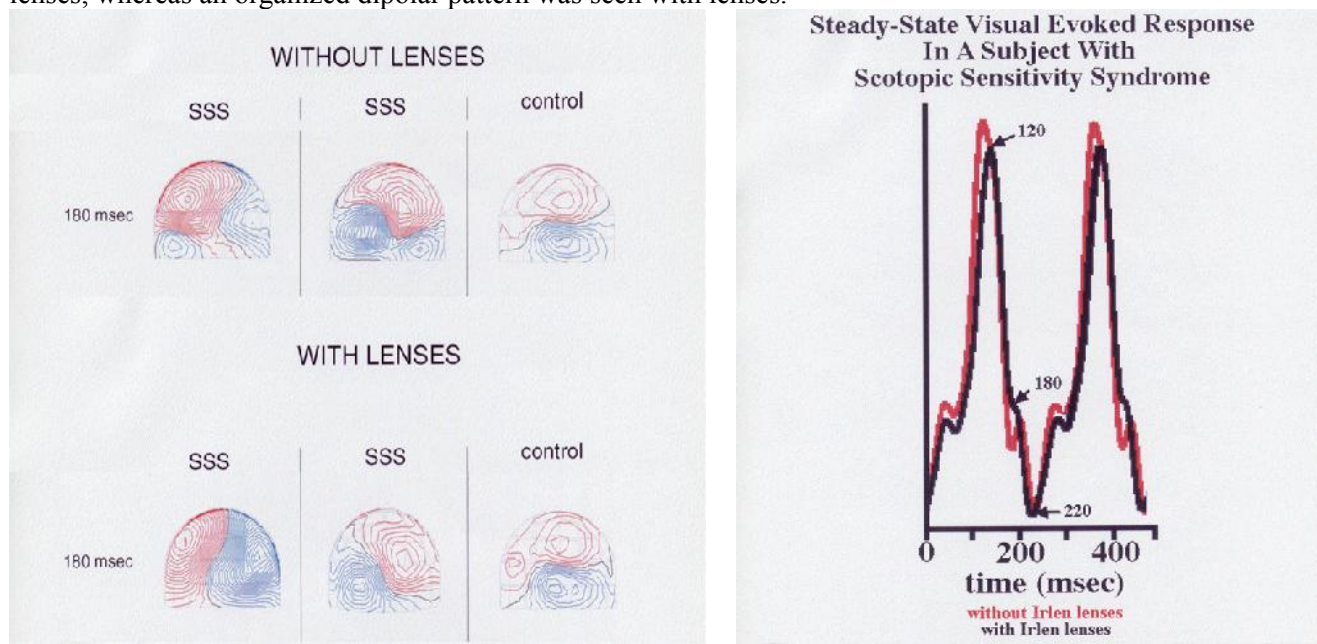
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Many persons with poor reading skills and habits demonstrate significant visual fatigue and discomfort when observing high contrast, high luminance stimuli. Dizziness, headaches, strain or fatigue are some of the ancillary findings in Scotopic Sensitivity/Irlen Syndrome (SSS) that compound reading difficulties. Under high luminance conditions, words distort. They may float above the page or jumble into a wavy, incomprehensible tangle. The background may pulsate or eradicate parts of letters. Several behavioral studies demonstrate that many of the deleterious aspects of the condition can be alleviated by wearing colored Irlen lenses, the best color being different for each patient.

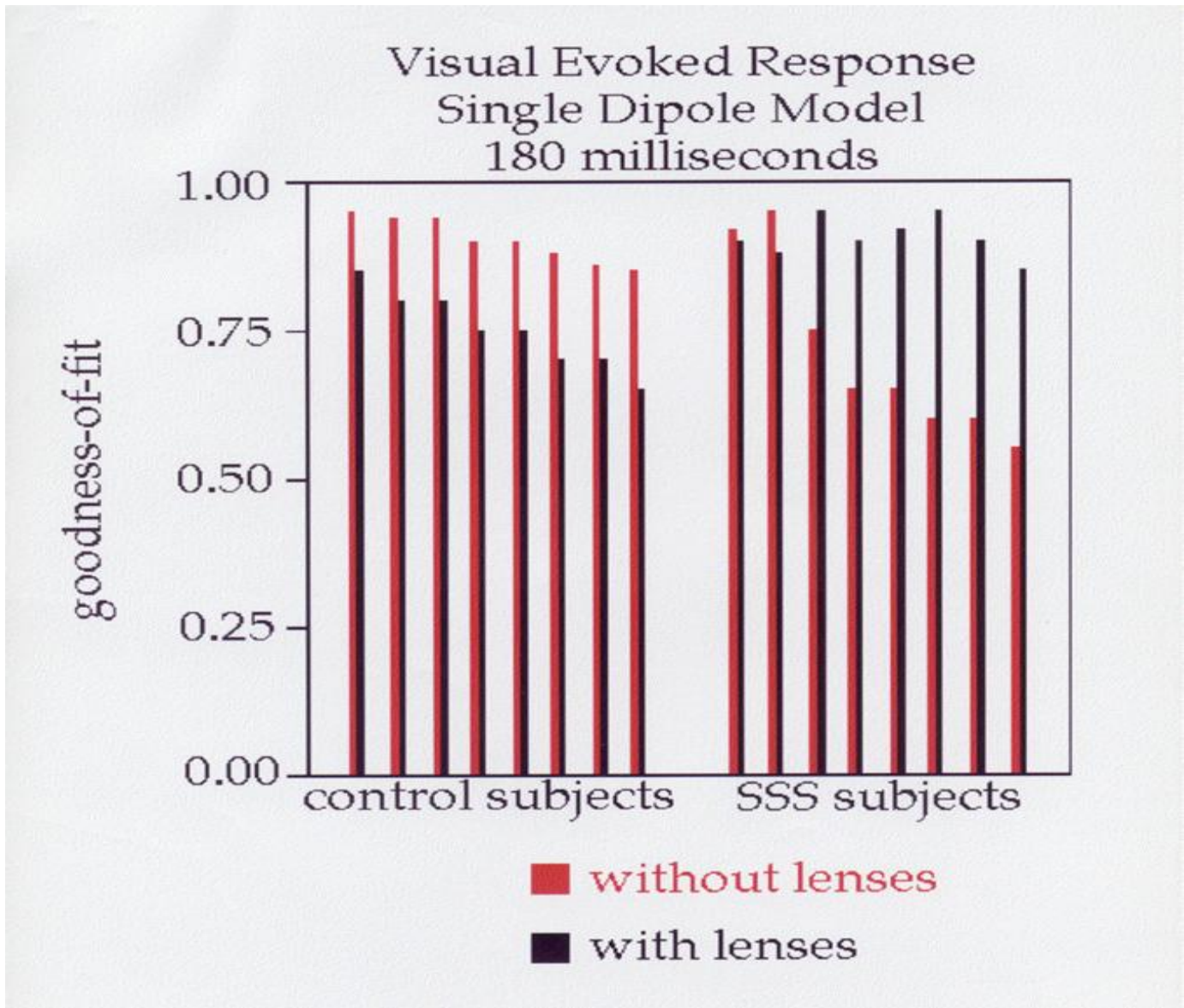
At present, the relevant physiological mechanisms are unknown; but presumably they are related to altered visual information processing. In this study, magnetoencephalography (MEG) was used to characterize visual responses in conditions with and without lenses. Steady-state visual evoked magnetic fields were recorded from 8 subjects with SSS and 8 normal control subjects using a 122-channel, whole-head biomagnetometer. During the testing, subjects fixated the center of a 4 square checker board that contrast reversed every 200 msec. There was a small black circle at fixation that briefly flashed white every 1-2 seconds, and subjects were instructed to count flashes.

For the SSS group, each subject was evaluated with and without custom colored Irlen lenses. Control subjects were tested without lenses and with a lens pair that caused the maximum change in luminance. In all cases, the evoked magnetic signal reflected a complicated pattern of bilateral activation of multiple cortical generators. A major difference in with and without lens conditions was seen between 170 and 200 msec post-stimulus.

For normal subjects, without lenses, the field pattern at this time was mostly dipolar and reflected midline calcarine activity. When lenses were on, the pattern was much more complex, reflecting multiple generators. The reverse situation was seen for 6 or 8 subjects with SSS. That is, a complex field pattern was seen without lenses, whereas an organized dipolar pattern was seen with lenses.



The data suggest that the colored Irlen lenses provide for normalization and crystallization of visual information processing in most members of the SSS population.



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