Computer program improves visual acuity of adult amblyopic patients

ATLANTA — A versatile, Internet-based program improved best corrected visual acuity and contrast sensitivity in patients older than 10 years with unilateral amblyopia, according to a study presented at the American Academy of Ophthalmology meeting.

“There is much skepticism regarding the ability to improve the amblyopic eye after about age 9 years," said Dr. **Henia Lichter, of Enaim Medical Center–Israel, directed by Dr. Samuel Levinger**, at the meeting. "I was initially skeptical as well.”

"The NeuroVision program," she explained, "is designed to sharpen contrast sensitivity functions for normal purposes. It sharpens the image and, therefore, the visual acuity. The treatment is tailored to the individual's needs."

Program stimulates visual cortex

The subject sits 1.5 m from the computer screen. The non-amblyopic eye is covered with a frosted lens. The subject performs tasks with the program, based on Gabor patches, to stimulate the primary visual cortex.

The full treatment consists of about 40 sessions lasting 30 minutes each. The sessions can take place in a clinical setting or at home.

"So far," according to Dr. Lichter, "Neurovision has been used in about 70 subjects in our practice. Some are still undergoing treatment."

“We do not perform any refractive surgery when best corrected visual acuity is worse than 20/80,” Dr. Lichter said. “So NeuroVision improved the subjects’ level of treatment. In 2 cases, NeuroVision was applied following refractive surgery.”

Patients, methods and results

The study included 26 patients (26 eyes) of mean age 28 years (range, 10 to 65 years) with unilateral amblyopia due to anisometropia, strabismus, or both. Exclusion criteria were ocular disorders, attention deficit disorders, and migraine headaches or epilepsy. Best-corrected visual acuity ranged from 20/30 to 20/100 before treatment.

After treatment, best corrected visual acuity improved in 25 patients (96%). Mean values decreased from 0.54 LogMAR (20/80 Snellen equivalent) to 0.35 LogMAR (20/40 Snellen equivalent). There was a mean gain of 1.9 ETDRS lines (range, 0 to 5 lines) which was statistically significant.

Mean stereoacuity improved from 300 seconds of arc to 140 seconds of arc. Contrast sensitivity improved in all frequencies.

Ten of the 26 patients completed 1-year follow-up. Visual acuity was maintained in all cases.

The results showed that the best corrected visual acuity improved more in amblyopic eyes with emmetropia than in eyes with myopia or hyperopia. We speculate that, "This may be attributable to the greater likelihood of the visualized image to be focused on the retina.”

"These findings are extremely exciting," Dr. Lichter claims. “NeuroVision can improve visual performance, visual acuity, contrast sensitivity and stereoacuity in adults with amblyopia. It can also be applied as a complementary treatment for refractive surgery. We may, for the first time, be able to tell people that help for adults with amblyopia is available."

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We have no financial interest.