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## Information technology, general care

### Computer display on glasses helps to overcome tunnel vision

11 September 2006

Scientists at Schepens Eye Research Institute, an affiliate of Harvard Medical School, say a visual aid they invented promises to improve the visual abilities of people with tunnel vision. In the first study to evaluate this small high tech device, the research team saw a significant increase in the effectiveness and speed with which visually impaired individuals found objects.

The study — in the September issue of *Investigative Ophthalmology & Visual Science* — shows that this device, which combines a tiny camera, pocket-sized computer and transparent computer display on a pair of glasses, may offer the most effective assistance to date for this patient population.

“We are very pleased with the results of this first evaluation and hope that with further study and refinement, we may soon make this device available for the public,” says low vision expert Dr. Eli Peli, the inventor, a senior scientist at Schepens, and a professor of ophthalmology at Harvard Medical School and the senior author of the study.

About one in 200 Americans over age 55 suffers from tunnel vision, as a result of diseases such as retinitis pigmentosa (RP) and glaucoma. RP can begin to affect vision in one’s teen years and may become quite severe tunnel vision by middle age. Residual tunnel vision occurs when peripheral or side vision is destroyed, leaving only a small window of central vision.

The field of view of these patients can be likened to looking through the tube of a roll of paper towels. Thus, tunnel vision can often cause the individual to bump into or trip over obstacles. “Navigating city streets or buildings can be quite challenging,” says Dr. Gang Luo, the study’s first author, adding that for a person with tunnel vision, finding a misplaced

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item is like searching for a key in a dark room using a tiny flashlight. Luo is a research associate at Schepens Eye Research Institute and an instructor in Ophthalmology at Harvard Medical School.

Until now, patients primarily have relied on long canes to warn them of obstacles just in front of them. Glasses that act as reverse binoculars, miniaturizing and pulling in the missing parts of their visual field, were suggested and tried in the past. "The minifying glasses make things so small that detailed visual information is sacrificed, so most patients have given up these spectacles, and the most used type was discontinued last year" says Peli.

Peli's new visual aid — which he developed with the help of MicroOptical Corp. of Westwood, MA — allows the patients to see detailed visual information through the transparent display, while also viewing a superimposed minified outline version of a wider visual field. The tiny computer-video system provides updated outline information 30 times per second. When a patient becomes aware of a possible obstacle or important object in the superimposed outline image, he can move his head and eyes to look directly at the object through the display.

"All patients only had an hour of training on this device before they were tested," says Luo "The search directness was improved for all subjects, which means they were not searching aimlessly, as they did without the device. However, the speed of head and eye movements was reduced when patients used the yet unfamiliar device. We believe that a few days of training would improve their speed and thus increase their search abilities dramatically."

Based on these results, and following further improvement of the device, the team will test the usefulness of the device by providing it to patients for use in their homes and for outdoor activities.

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