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Novel, high-powered prisms to expand vision fields of patients with hemianopia

Doctors of optometry will soon have another treatment option for patients with hemianopia, a condition that affects 1 million Americans.

"Manipulating the variables of traditional prism application for a novel purpose is quite creative."

In May, researchers at the Schepens Eye Research Institute, Massachusetts Eye and Ear at Harvard Medical School unveiled three eyeglass designs using novel, high-powered prisms to further expand the vision fields of patients with hemianopia.

Often the result of a stroke or traumatic brain injury, hemianopia causes a patient's field of vision to shrink from 180 degrees to 90 degrees. Either their left, right, upper or lower vision fields are missing. The premise behind the peripheral prism glasses is that

they shift objects from the patient's blind side to his or her sighted field, making patients more aware of objects around them.

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EDITOR'S

Led by Eli Peli, O.D., professor of ophthalmology at Harvard Medical School and the Moakley Scholar in Aging Eye Research at the Schepens Eye Research Institute, the research team developed three kinds of new prisms designs, which are still in various phases of production, including:

- **Yoked Prisms in the Carrier Lens**

The peripheral prism is embedded into spectacles with prismatic power in the opposite direction, expanding the vision field up to 36 degrees and the scanning range by five degrees.

- **Bi-Part Double Fresnel Prism**

Peripheral prism glasses combine two Fresnel prism segments angled to each other. This design expands the vision field up to 43 degrees and the scanning range by 14 degrees.

- **Mirror-Based Periscopic Prism**

Multiple pairs of angled mirrors deflect the image from the blind side to the seeing side and expand the visual field more than 40 degrees, allowing a much wider scanning range into the blind side.

Prism power

The new prism designs are an evolution of Dr. Peli's original design, which expanded patients' vision fields between 20 to 30 degrees and were first manufactured about a decade ago. Five years earlier, he had been at a vision conference where he challenged experts there to help him find a better treatment for patients with hemianopia.

"Unfortunately not one person came to discuss possible solutions," recalls Dr. Peli. "I came up with the basic design on the flight home."

He adds, "Over the years, we have increased the prism power and, thus, the size of the field expansion provided. It is extremely rewarding to fit these prisms and see the great impact they bring to the lives of many patients."

More options for patients and optometrists

Even incremental progress can be meaningful for patients, say members of the AOA's New Technology Committee.

"Using prisms, in the fashion described in this article, is a new approach that appears to offer improved outcomes," says Dominick Maino, O.D., who practices in Chicago, Illinois, and is a professor of pediatrics/binocular vision at the Illinois Eye Institute/Illinois College of Optometry. "Doctors of optometry *and* patients now have more options to choose from to improve the ability of patients to interact with the world around them.

Doctors who practice low-vision rehabilitation will be particularly interested in these developments, says Geoffrey Goodfellow, O.D., professor of pediatrics/binocular vision at the Illinois Eye Institute/Illinois College of Optometry.

"What makes the new spectacles different is they are also including prisms in the carrier lens in the opposite direction, which allows the two strips of embedded prisms to now be higher power than before," Dr. Goodfellow says. "This allows the prisms to shift the object even farther than before, which will allow the patient to perceive more objects in his or her blind field."

He adds, "Manipulating the variables of traditional prism application for a novel purpose is quite creative. Using traditional prisms in a new and different way is an exciting yet cost-effective way to help patients."

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