Chadwick Optical Uses Cutting Edge Technology For Low-Vision Clients

By Linda Himadi

Everyone has heard of the hard of hearing, but few know very much about the 'hard of seeing.' The hard of seeing are people with a variety of conditions that can result in low vision. Many of these people would be categorized as legally blind. About 20 million Americans have eye diseases which could lead to low vision. Out of 33,000 optometrists in the country, probably less than 800 of them deal with low vision patients.

Enter our heroes. Karen Keeney owns and is the President of Chadwick Optical, Inc., a small optical laboratory in White River Junction, Vermont. Dr. Eli Peli is a Senior Scientist and Moakley Scholar in Aging Eye Research at the Schepens Institute, an affiliate of Harvard University. He is a professor of Ophthalmology at Harvard Medical School, on the faculty at New England College of Optometry in Boston, and has been caring for the visually impaired since 1983 as the Director of the Vision Rehabilitation Service at New England Medical Center Hospitals in Boston. He has authored over 120 papers, received awards, and since 1984 has been getting many grants from the National Institutes of Health (NIH), other agencies, and companies to develop visual aids for low vision clients. He holds six U. S. Patents.

Keeney and Dr. Peli met by 'chance' at a conference in Florida. "Karen had a suitcase full of prism devices and extreme prisms that could be developed as low vision aids," explains Dr. Peli. "I had been thinking about prisms and their abilities to increase my patients' visual fields. A few years before I met Karen, I gave a presentation at a big symposium that attracted many of the most eminent people in the field. I talked about several eye conditions. For all of these conditions, our professions had little or nothing to offer. I challenged my colleagues, asked them for ideas, and pleaded with them to talk to me. Out of 400 colleagues, not one came up to me to discuss any of these issues. I got very upset and realized I would have to initiate the ideas myself. On the flight back, I came up with a really good idea: fitting prisms horizontally on the top and bottom of the lens to increase the patient's visual field while keeping the center clear, causing less distortion and confusion," says Dr. Peli.

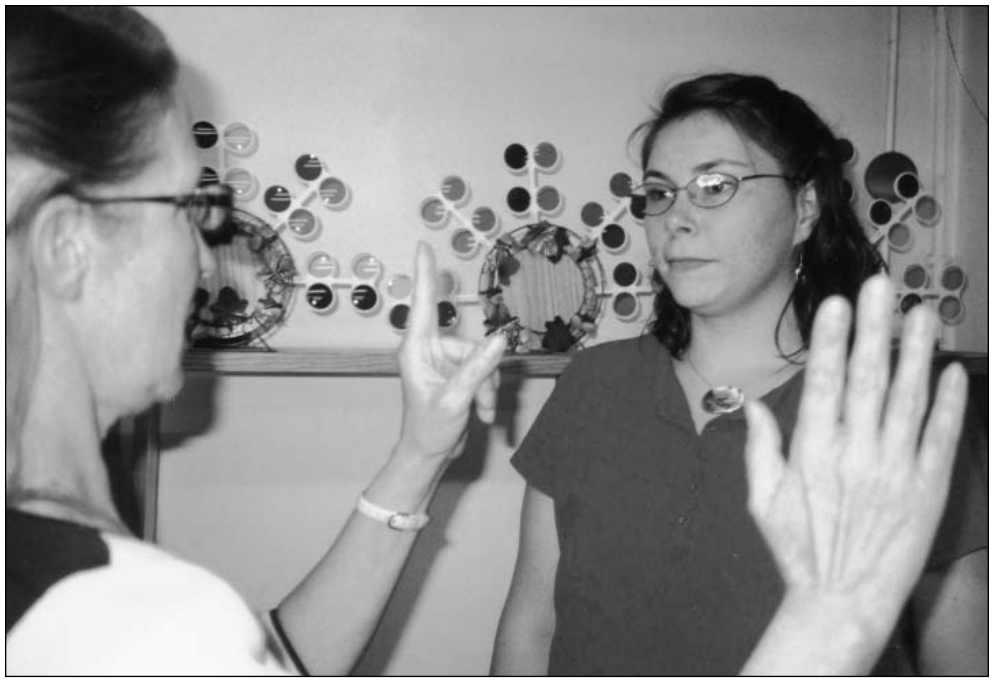
Hemianopia is a condition where half the visual field has been lost on one side in both eyes. It can be caused by stroke, head injury, brain tumors, or as a side effect of brain surgery. People with hemianopia frequently can't drive, have trouble maneuvering in crowds, and they are often black and blue on one side of their body from bumping into people and things. In the U. S. there are about one million people with hemianopia. "In the past when a hemianope walked into my treatment room, I became very uncomfortable because I knew the textbook solutions were not working," explains Dr. Peli.

In order to develop Dr. Peli's idea, the Expansion Prism Lens or the EP-Horizontal Lens, Chadwick Optical applied for and received a grant from NIH. Keeney received the grant in 2003 and developed a pair of eyeglasses for hemianopia that were released in April of 2005. "The new prisms bring the images across the midline and increase the visual field 20 percent. Theoretically, it may be possible to increase the visual field quite a bit more. The new prisms have already made a big difference for patients. Some are regaining their driver's licenses, going back to work, and moving confidently through their environment," says Keeney.

Every federal agency is mandated to designate 2½ percent of their research budget to grants for small businesses. The Small Business Innovative Research (SBIR) Program is an effective program because small businesses can develop new products and have them on the market much more quickly than large companies. Small businesses are generally interested in important products with relatively small markets that are not of interest to large companies.

Keeney has a Master of Science in Business Administration degree and is certified by The American Board of Opticianry. "I had never applied for a grant before. There are eight people in this company, and we really struggled to develop the grant proposal. In 2003 we were awarded $500,000 from the National Eye Institute of NIH to develop the EP-Horizontal Lens. This year, in view of our success with the previous grant, we received a Phase 2 grant of $750,000 from NIH to develop the EP-Oblique Lens and incorporate higher prism powers for increased field expansion. These prisms are designed for permanent use, so they have to be robust and safe, yet cosmetically acceptable for the patients."

The prisms are capsule shaped with thin vertical lines and are quite flat. Earlier prototypes were very thick,



Company President Karen Keeney (left) demonstrates the Peli Prism lens insert worn by office manager Gen Gibson.

expensive, and possibly unsafe. There are also temporary stick-on Peli Prisms that patients can try at a very low cost. 3M manufactures the stick-on material.

"In order for us to develop these prisms, we had to work with very fine tolerances unheard of in the eyeglass industry. We bought special equipment that no other optical labs have. We hired a machinist and an engineer who work full-time at North Hartland Tool Corporation and moonlight at Chadwick Optical. It is quite exciting to be a cutting-edge optical lab," comments Keeney.

Chadwick Optical also makes a rainbow of tinted lenses to help people with photophobia or light sensitivity, macular degeneration, and glaucoma. The business makes small red lenses that perch on the top of the eyeglasses that can help people who have trouble distinguishing red and green. "We have a common sense approach and we try to keep things simple. For someone bent over from osteoporosis, we have a clip-on prism to help that person see what's ahead. For someone in a neck brace, we also have one to help him see the food on his plate,' says Keeney.

"My grandfather was legally blind," explains Keeney. "He spent a lot of time and money traveling throughout the U. S. and Europe consulting the best eye surgeons. They all said nothing could be done. Finally, when he was 80 years old, I took him to an optometrist in Montpelier, Vermont, who found he had an undiagnosed and uncorrected astigmatism. My grandfather's vision vastly improved with a proper eye examination and with subsequent prescription lenses. The renowned eye surgeons had overlooked this most basic approach.

"In this field it constantly amazes me how often those with the highest professional status have the least knowledge about what can be done to enhance the quality of life of legally blind people. There are a handful of optometrists who specialize in low vision and spend a great deal of time testing which, if any, glasses or tints will help the patient. There are social workers in the vision care field who make home visits and restructure the home environment in simple ways, improving lighting and reducing glare, making daily living easier,' says Keeney.

"My philosophy is 'What you give comes back to you,'" says Keeney. Chadwick Optical donates seconds to Third World countries, such as Sri Lanka and Micronesia. Micronesia has a large number of people with a genetic form of photophobia. Chadwick Optical makes glasses for the Medicaid program. Dr. Peli volunteers with VOSH (Volunteer Optometric Services to Humanity) and has volunteered his services in Costa Rica, Liberia, and Nicaragua to name a few.

Dr. Eli Peli and his brother Doron Peli have published a book, *Driving with Confidence: A Practical Guide to Driving with Low Vision*. They are hoping to educate the visually impaired and their families, optometrists, ophthalmologists, low vision researchers, driving instructors, Motor Vehicle Bureaus, and legislators. Each state has its own vision requirements for driving. Many low vision driving students, using their new aids, can complete special training and perform at comparable levels as those with normal vision.

Keeney and her employees at Chadwick Optical and Dr. Peli and his colleagues are trying their best to help the hard of seeing step into the light of a fuller life. ❦