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News Release

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New Technology: Fast-Darkening Glasses For Veterans With Light-Adaptation Problems

There are 1.5 million Veterans with a vision impairment, of whom 25-30% have light adaptation problems. This number has been increasing in recent years as Veterans have aged, and greater numbers have contracted age-related eye diseases. People with normal vision have what might be called “visual reserve.” That is, they have better vision than is needed to walk around safely. People with light adaptation problems are at high risk for trips and falls because any change in light level reduces their ability to see obstacles, curbs, stairs, etc. It can take from two to three minutes for their eyes to adjust to bright outdoor sunlight when going outdoors, or to indoor lighting levels when going inside. Until their eyes adapt, they have a great deal of difficulty seeing what’s around them, and could easily trip and fall.

The standard practice by the VA eye clinic to accommodate these Veterans is to provide them with 3 or 4 different shades of dark prescription glasses: a shade for bright indoor settings, a shade for bright outdoor settings, a shade for cloudy days, and a shade for bright hazy days. VA ophthalmologists test each Veteran’s eyes and prescribe glasses with just the right shade of darkness to optimize vision for each type of indoor and outdoor light level. There are also existing glasses that darken, such as Transition lenses, but they can take up more than a minute to darken and longer to lighten. They, also cannot be customized to the Veteran’s specific needs.

To help improve the quality of life for our Veterans with light adaptation problems, VA Center for Visual & Neurocognitive Rehabilitation (CVNR) Researcher David Ross is collaborating with engineering firm Ashwin-Ushas to develop fast-darkening prescription lenses for Veterans with light adaptation problems.

The fast-darkening technology in this collaborative research project uses an electrochromic film that darkens in three seconds, and goes completely light in 4 seconds. They have a light sensor that measures the amount of light reaching the Veteran’s eyes. In a previous phase one project, Mr. Ross developed a prototype using this fast-darkening technology. The prototype was a full set of glasses that fit over the Veterans existing prescription glasses. A circuit built into the frames automatically darkens or lightens the lenses to adjust the light entering the eyes to the right level for optimal vision, as prescribed by the ophthalmologist.

In a recently funded grant to implement phase two, Mr. Ross in partnership with Ashwin-

Ursas will develop standalone prescription glasses where the lenses are coated with the fast-darkening electrochromic film. While individually more expensive than typical prescription glasses with a dark coating, these fast-darkening glasses will be less expensive and less cumbersome than the set of 3 to 4 shades of dark glasses currently prescribed. They will also be able to automatically adjust to a multitude of lighting conditions.

Says Ross: “These are the glasses everyone with a visual impairment will want because they make your vision the best that it can be regardless of your level of impairment. It’s a high tech one size fits all.”



Split screen image showing the lens darkening when a bright light is turned on.

Photo taken by Adam Hernandez, VA Medical Media