New Ultrasonic Device Will Aid Individuals with Visual Field Loss After Stroke or Brain Injury

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Ocutech, Inc. announces the release of its new ultrasonic sensor device called the SideSight? that will allow individuals who have experienced loss of side vision (Hemianopia) to walk safely without concerns of bumping into obstacles or being startled by individuals walking into their path.

It is estimated that there are between 500,000 and 1 million individuals in the US who have a one-sided loss of their vision, called Homonymous Hemianopia (HH) (also called Homonymous Hemianopsia). While HH is most frequently caused by a stroke, it can also result from other causes including head trauma, brain tumors and developmental disorders. HH is not the same as loss of vision in one eye?individuals with no vision in one eye can still see to both sides of their line of sight with their remaining eye. Not so with HH. In Homonymous Hemianopia, depending upon which half of the brain is impaired, neither eye will have vision to the affected side. If the right brain is involved, the vision loss is on the left side, and if the left brain is affected the right visual field will be lost. HH can have a much more profound impact on visual functioning, mobility and independence than does loss of one eye.

Studies have demonstrated that people with hemianopic visual field defects have an increased risk of accidents (Ramrattan et al.). People report walking into objects, tripping and falling, feeling unsafe, getting lost, and experiencing panic when in crowded or unfamiliar areas (Robinson et al.). Studies have also found that patients with HH were deeply concerned about their ability to move independently (Wagenbreth et al.). The homonymous hemianopic visual field defect interfered with patients? daily living activities related to movement more than {did} monocular {one-eyed} blindness (Choi et al).

Traditional eyeglass options designed to treat HH contain one or more prisms that either move the image to make it easier for the individual to scan into the non-seeing visual field, or create a second image that is superimposed over the normal visual field to help the wearer be aware of obstacles in the non-seeing visual field. These prismatic eyeglass techniques require training, practice and adaptation and can be both fatiguing and cognitively demanding.

The SideSight development project is led by Henry Greene, OD, FAAO, co-founder and president of Ocutech, Inc. Founded in 1984, Ocutech is a firm devoted to developing devices to aid the visually impaired. ?After two years in development and testing we are very pleased with the response from our demonstrations to both patients and vision rehabilitation specialists regarding its performance and potential value,? says Greene. ?The SideSight will monitor the 45 degree field of view both horizontally and vertically on the non-seeing side. This is the area of the visual field that studies have shown is the most prone to collisions for individuals with HH. If the device senses the potential for a collision it will vibrate to alert the patient to look into the non-seeing visual field.?

Similar in concept to the blind-spot monitor on the sideview mirrors of modern cars, the SideSight will be easy and intuitve to use. The customizable firmware is designed to allow the device to be helpful but not intrusive. Evaluated in both academic and private practice settings the SideSight? was found to be especially helpful for newly hemianopic, chronic hemi-spatial neglect, and tunnel vision patents (where the device can be attached to both sides of the eyeglass frame).

The device is lightweight weighing only 0.6oz (20gm) and is about the size of a pinky finger. The SideSight? can be attached to conventional eyeglass frames using either a clip-on or a magnetic attachment method. It will operate for 12 hours on its self-contained rechargeable battery.

References:

Ramrattan, R. S. et al. Prevalence and causes of visual field loss in the elderly and associations with impairment in daily functioning: the Rotterdam Study. Arch. Ophthalmol. 119, 1788?1794 (2001).

Robinson, R. G. & Jorge, R. E. Post-stroke depression: A review. Am. J. Psychiatry. 173, 221?231 (2016).

Wagenbreth, C., Franke, G. H., Sabel, B. A. & Gall, C. Impairments of vision-and health-related quality of life in stroke patients with homonymous visual field defects depend on severity of visual function loss. Klin. Monatsbl. Augenheilkd. 227, 138?148 (2010).

Choi, Hy., Kim, SJ., Kim, S.Y. et al. Comparison of vision-related quality of life in patients with homonymous hemianopia and monocular blindness. Sci Rep 12, 6558 (2022). https://doi.org/10.1038/s41598-022-10626-

Additional Resources:

Homonymous Visual Field Defects and Stroke in an Older Population https://www.ahajournals.org/doi/10.1161/01.str.0000037647.10414.d2

Hemianopsia https://www.ncbi.nlm.nih.gov/books/NBK562262/ https://en.wikipedia.org/wiki/Homonymous_hemianopsia

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