

The Implantable Miniature Telescope for Patients with Age-related Macular Degeneration

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Age-related macular degeneration is a degenerative condition of the central portion of the retina, a specialized area responsible for detailed central vision. AMD is typically brought on by the hardening of arteries that supply the macula, depriving the cells of necessary oxygen and nutrients. The most troubling symptom is a severe loss of central vision, causing simple tasks like driving or reading to become rather difficult.

AMD generally affects adults ages 50 and older and can be categorized into two types: dry and wet AMD. Dry AMD is far more common than wet AMD, accounting for 90% of documented cases. This type is characterized by small, yellowish deposits known as drusen that form within the layers of the retina as well as a loss of pigmentation in the retina itself, causing a more gradual and less severe loss of vision. Wet AMD is caused by the development of new blood vessels under the retina that can hemorrhage, swell, and form scar tissue.

Although a definite cause has yet to be determined, a variety of factors have been speculated to play a role in the development of AMD, including genetics, age, nutrition, smoking, and sunlight exposure. Symptoms consist of loss of central vision (both gradual and sudden), difficulty in the performance of tasks requiring detailed vision, and distorted vision (straight lines appearing as bent or wavy). An eye physician can usually diagnose AMD through an array of routine eye tests, such as an Amsler grid test, an ophthalmoscopy, fundus photography, a fluorescein angiography, or a routine vision test. To date, there is no standard medical therapy for dry AMD. Patients with wet AMD have experienced various successes with treatments such as laser photocoagulation and photodynamic therapy, which serve to stop the abnormal growth of blood vessels and prevent them from leaking.

One promising breakthrough in the treatment of AMD is the Implantable Miniature Telescope (IMT™) developed by Dr. Isaac Lipshitz at Vision Care Ophthalmic Technologies in Saratoga, CA. Designed to be a permanent solution, the prosthetic telescope can enlarge images either 2.2X or 3X their original size, depending of the specific model used. This effectively serves to diminish the overall size of the scotoma by focusing the images on the healthy central and peripheral portions of the retina in place of the damaged macula. The result is a telephoto effect that utilizes 55% of the retina in comparison to the 5-10% of the damaged macula. The IMT can be implanted in an



outpatient surgical procedure by an ophthalmic surgeon. Only one eye can receive the device, while the opposite eye is used for peripheral vision necessary for mobility and navigation. In conjunction with structured vision rehabilitation, patients can learn to use the device to scan their environment with natural eye movements.

The IMT has recently completed its Phase II/III clinical trials. The trial observed 206 eyes that were successfully implanted with the device. To participate in the trial, patients had to have a preoperative best-corrected distance vision between 20/80 and 20/800 and a minimum five-line improvement on the visual acuity chart with the aid of an external telescope. The average age of the patients was 72 and 52% were male. At the end of one year, the mean distance BCVA of the study eye improved from 20/316 to 20/141. Additionally, there was reported progress in the National Eye Institute Visual Function Questionnaire of overall quality of life of the patients as well as a trend towards improved color vision. The IMT is currently seeking FDA approval and, if successful, “will play an important role in the treatment of visual disability associated with end-stage AMD.”

References:

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