Lens Helps Cataract Patients See At All Distances

University of Arizona

Imagine having cataracts, then finding a way to see - at all ranges - without contacts or glasses. Previous cataract surgeries offered clarity for only two distances: near and far. What about the intermediate range?
A University of Arizona optical scientist has realized this vision for some by designing implantable cataract replacement lenses that allow for mid-range sight. The lenses were developed by Jim Schwiegerling, a professor in the Department of Ophthalmology and Vision Science in James C. Wyant College of Optical Sciences.

As we age, the precisely structured proteins that create the eye's naturally transparent lens begin to clump, causing cataracts that cloud vision. The routine solution to this problem for nearly 50 years was surgery to replace our natural lenses with artificial intraocular lenses. The downside is the inability of these lenses to focus near, requiring the recipient to wear reading glasses. In the 1990s, bifocal intraocular lenses became commercially available to address this issue. The problem is that their design offers clarity for only two distances: close up and far away.

"One of the complaints about bifocal lenses is that you can drive a car and read, but everything in between is kind of fuzzy. With the prevalence of screens in the modern day, people want that extra intermediate distance," Schwiegerling

said.

With support from Tech Launch Arizona (TLA), the UArizona office that commercializes inventions created from research, patents were filed and granted to the Arizona Board of Regents. TLA then partnered with Alcon, a global medical device company specializing in eye care products and one of the largest producers of intraocular lenses in the world, providing the company a license to use the UArizona technology in its products.

Alcon incorporated Schwiegerling's patented technology in its novel trifocal intraocular lens, PanOptix, launched in Europe in 2015. Eventually, PanOptix was approved for use in countries around the world, and in summer 2019 the last two major countries – the United States and Japan – approved use of the new lenses.
Half a million people around the world have now received the trifocal Alcon lenses.

Besides offering better eyesight through a third focal distance, the lenses can also let more light into to the eye, which creates sharper, higher contrast images, solving yet one more common problem of bifocal lenses.
Schwiegerling himself discovered he had cataract in one eye in 2016, he said, but because PanOptix wasn't yet available in the U.S., he decided to travel to Germany to get the lens implanted.

"I'm a user and not just a maker," he said. "I am thrilled with being able to do my outdoor activities, work at the computer and read without being encumbered by glasses. I see like I am young again."

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