

New eye-tracker method shows 'preferred retinal location' in both eyes

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Eyes with central vision loss adapt by developing a new fixation point in a different part of the retina, called the preferred retinal location (PRL). Now for the first time, a new method makes it possible to identify PRLs in both eyes simultaneously, reports a study in the August issue of *Optometry and Vision Science*, official journal of the American Academy of Optometry.

The new eye-tracker technique may help in developing visual rehabilitation approaches to improve [binocular vision](#) for the many older adults with central [vision loss](#) affecting both eyes, according to the new research led by Esther G. González, PhD, of the Vision Science Research Program at Toronto Western Research Institute.

Technique Identifies PRLs in Both Eyes of Patients with Central Vision Loss

Central vision loss results from degeneration of the fovea—the central pit of the retina, where visual acuity is sharpest. The most common cause is age-related macular degeneration, which is also the leading cause of blindness in older adults. "Especially when present in both eyes, loss of central (reading) vision is a major intrusion on quality of life and everyday functioning," explains Anthony Adams, OD, PhD, Editor-in-Chief of *Optometry and Vision Science*.

Taking advantage of visual plasticity that persists even in old age, the

brain and eye can partly compensate for loss of the fovea by developing a PRL—shifting fixation to another nearby spot in the retina. Patients learn to use an area of their peripheral vision to substitute for their lost central vision.

A technique called microperimetry with eye-tracking can precisely identify the PRL, but only in one eye at a time. This may not adequately represent binocular function—vision with both eyes working together. "Understanding binocular vision is important for designing optimal rehabilitation methods for [patients](#) with central vision loss," Dr. González and coauthors write.

They developed a method to establish the PRLs in both eyes, based on the relationship between microperimetry and eye-tracking measurements in healthy eyes. Predicted PRLs in nine [older adults](#) with central vision loss were compared with the findings of standard PRL assessments in the two eyes individually.

All patients had at least one PRL fall onto a functional area of retina during binocular viewing. In most cases, the PRLs were found in corresponding locations in the two eyes—that is, in about the same position relative to the center of the retina. The one patient whose PRLs were not in corresponding locations had problems with double vision (diplopia).

Dr. González and colleagues note some important limitations of their "proof-of-principle" study. Further studies will be needed to evaluate the new eye-tracker method in a broader sample of patients with central vision loss.

By enabling simultaneous identification of the PRLs in both eyes, the technique provides important information on binocular function in eyes with low central vision. At least for some patients, the results may help

to guide approaches to maximizing binocular vision—for example, through relocation training to help move the PRL to the corresponding location in both eyes.

The [eye](#)-tracker method may be especially valuable for managing the large number of patients with age-related macular degeneration affecting both eyes. Dr Adams comments, "Such an approach not only allows a better understanding of how the eyes and brain deal with binocular [central vision](#) loss, but also opens up exploration of new approaches to visual rehabilitation for these individuals."

More information: "Identifying Absolute Preferred Retinal Locations during Binocular Viewing" ([DOI: 10.1097/OPX.0000000000000641](https://doi.org/10.1097/OPX.0000000000000641))

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