

Rapid eye movements significantly delayed in people with glaucoma

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Rapid eye movements are significantly delayed in patients with glaucoma, even those in the early stages of the disease, research has found.

The findings, led by Dr. Neeru Gupta, an ophthalmologist at St. Michael's Hospital, may shed new light on why [glaucoma](#) patients are at increased risk for falls and [car accidents](#). Glaucoma is the leading cause of irreversible blindness.

Rapid (or saccadic) [eye movements](#) are the quick, simultaneous movements of both eyes in the same direction. They are involved in a myriad of everyday activities, from reading to scanning the surrounding environment, be it a busy subway station, grocery store shelves or oncoming traffic.

Dr. Gupta and co-workers studied groups of people with and without glaucoma who wore a head-mounted device that measured the length of time it took their eyes to move from one point to another, how long it took their eyes to begin the movement, did they focus on an object right away or did their eyes overshoot the [target](#).

"Most of us take that processing of information for granted," she said.

However, she found that people with glaucoma showed delayed eye movement reaction times by about 15 per cent, even if they were in the early stages of the disease.

The findings were published online in the journal *Eye and Brain*.

Dr. Gupta said the findings are significant because they suggest that approaches to measuring vision loss beyond eye charts or visual field tests that related to real world settings may provide important clues to how the disease affects the lives of glaucoma patients. Glaucoma is becoming more common as the population ages and is expected to affect 80 million people worldwide by 2020. About half of all cases remain undiagnosed.

Currently, glaucoma can be diagnosed only by using a light to examine the optic nerve. Eye charts will not catch glaucoma, because it begins with peripheral vision loss long before reaching [central vision](#).

All treatments for glaucoma—eye drops, laser surgery and conventional surgery—are designed to reduce pressure in the eye and help slow or stabilize damage to optic nerve. No treatment can reverse the disease.

"Now that we know that eye movement reaction times are delayed in people with glaucoma, there is an opportunity to understand the effects of glaucoma on daily activities of living that most of us take for granted, such as walking up and down stairs, driving, navigating and reading. Dr. Gupta said. "Just as alcohol causes a delay in hitting the brakes, glaucoma slows the time it takes to move the eyes quickly in response to a visual cue."

In previous work, Dr. Gupta and colleagues have demonstrated that glaucoma is a neurodegenerative disease affecting major vision pathways in the brain. Dr. Gupta's current paper points to a new vision pathway in the brain that is affected in glaucoma. Ninety per cent of signals from the [optic nerve](#) travel to an area at the back of the brain called the lateral geniculate nucleus. But the brain signals for [rapid eye movements](#) appear to travel a different route through the area known as

the superior colliculus. A previous smaller study by Lamirel and coworkers published in the *Journal of Glaucoma* in 2012 also showed that saccades were impaired in four glaucoma patients with visual field loss.

Provided by St. Michael's Hospital

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