

Can Vision Lost From Glaucoma Be Regained?



The short answer to this question is, “No.”

The longer answer is, “Well, maybe, but (1) not by the time most people get diagnosed; (2) the amount of vision regained is so small that most people would not be aware of having regained vision; and (3) the vision regained may be lost again over time.”

Evidence exists that at the very early stages of glaucoma visual function can be restored.^[1] To date, however, there is only one known method of detecting such early loss. This method is a type of in-office testing called Pattern Electroretinography (PERG). Unfortunately, very few eye doctors have the equipment necessary to perform PERG as it is expensive and time consuming.

What about for those who already have visual field loss by the time they are diagnosed with glaucoma? Modest visual field improvement may be possible with treatment. This improvement is generally so subtle that it can be detected only with careful visual field testing and is unlikely to be perceived as an improvement by the person with glaucoma. Additionally, it appears that even this modest victory over glaucoma is transient. Of those who do experience improvement in their visual fields, most of this improvement is lost over a period of about five years even with treatment.^[2]

It's one of the tragedies of this condition that we don't yet have a way to permanently restore vision that has been lost from glaucoma. Since many people don't get diagnosed until they have already lost significant vision it's absolutely critical that effective treatment of glaucoma be initiated and continued.

This is a difficult concept to accept for many newly diagnosed with glaucoma. Glaucoma has no symptoms early on – it's painless and early vision loss isn't noticed during one's daily routine. On top of that many of us (at least in the United States) have been indoctrinated into believing that modern medicine has found a cure for just about every known disease. If we can cure most cancers, what's the big deal about a little elevated eye pressure? And, what about stem cells? Won't we be able to just grow a new optic nerve and plunk it into the damaged eye in a few years?

Modern medicine has provided some truly miraculous cures. Not that long ago someone with a cataract would face slowly progressing and irreversible loss of vision. Today cataract surgery can quickly restore 100% of the vision lost to a cataract. Can glaucoma really be that different?

Although great strides have been made in the treatment of glaucoma, the best we can currently do is slow the progression of the disease. Yep, that's right, we can't even halt vision loss. Successful treatment can slow the loss to a snail's pace but given enough time vision will be lost. As most patients with newly diagnosed glaucoma have remaining life expectancies of decades that creates quite a challenge for the treating physician.

The reason why we cannot presently stop glaucomatous loss of vision is because glaucoma is a disease of the optic nerve (the cable that transmits the signal from the eye to the brain). To date, medical science has failed to achieve regeneration of central nervous system tissues such as the optic nerve.

The optic nerve is essentially a bundle of smaller cables (700,000-1,200,000 to be precise).^[3] That sounds like quite a few, but over the course of our lives we naturally and progressively lose these fibers. How many of these fibers does the average person with a healthy optic nerve lose? Studies of the optic nerve suggest that the upper limit is around 5,000 per year.^[4] So if we all lived to be 100 years old we'd still have 200,000-700,000 nerve fibers left. That still seems like a lot, doesn't it?

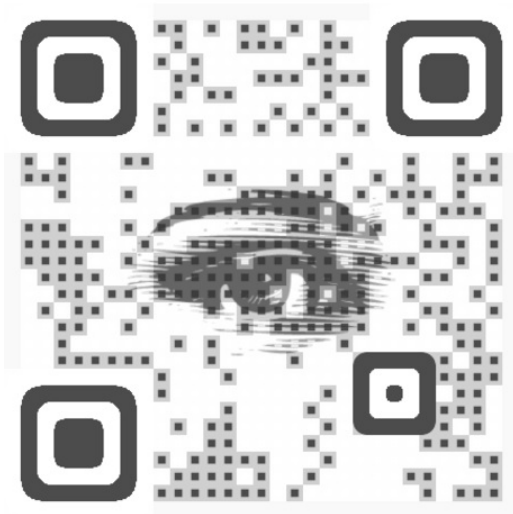
The problem is that by the time someone has lost vision from glaucoma it's estimated that half a million fibers have already been lost. If these fibers are so important why don't we notice a change in vision until we've lost half of them? Were those lost 500,000 fibers "extra", unnecessary, or redundant? Hardly.

One way to understand the optic nerve is to think of it like you would a tire. Imagine the nerve fibers as treads. If you have a tire that is rated for 40,000 miles you should be able to drive safely for about that distance before you wear down the majority of the tread. The tires perform quite well until that point. Once you pass the 40,000 mile mark, however, you notice that the tires don't grip the road quite as well and that they slip during a light rain. Why? Because you've worn down the treads and now have a tire that's almost bald. Was the rubber that made up the treads "extra", unnecessary, or redundant? Of course not. But what's left on the tire is simply not enough to meet the demands of driving out of the garage. So it is with the nerve fiber also.

Now, imagine that instead of driving carefully for those first 40,000 miles you instead drive like a teenager with sudden acceleration, fast cornering, and hard braking. You might wear through the treads in 20,000 instead of 40,000. Being a teenager without funds to buy a new set of tires you might decide at that point to drive more carefully and regularly check the air pressure. But no matter how carefully you drive after the treads are going bare you're not going to get another 20,000 miles out of those tires. The tires simply will no longer perform as well as they did when they had deeper treads. Additionally, the more wear on the tires, the worse they perform.

Such it is with glaucoma. Once the condition is diagnosed, many of the nerve fibers (treads) have already been worn away. For those lucky enough to be diagnosed early in the disease or late in life conscientious and disciplined treatment of their glaucoma can reduce the rate of nerve fiber layer loss (tread wear) to allow for good functional vision throughout the remainder of their life. For those who are diagnosed after significant vision has already been lost or at a young age even aggressive treatment (similar to carefully driving along on bare tires at 5mph) will not be enough to prevent blindness (or in the case of tires, a blowout) during their lifetime.

Fortunately, just as someone who takes her car in for scheduled inspections is more likely to discover unusual wear on her car's tires, those who get their eyes checked regularly by an eye doctor are more likely to have glaucoma detected at an early stage. With a car such early detection of excessive tread wear could be addressed with tire rotation and balancing as well as a modification in driving habits – effectively extending the expected range of the tires. The same is true with glaucoma. Early detection and treatment can result in years of additional functional vision that would otherwise have been lost to this disease.



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