



## THE IMPORTANCE OF THE OPTIC NERVE IN GLAUCOMA MANAGEMENT

BY STEVEN LITINSKY, MD

Glaucoma is ultimately a disease of the optic nerve. In all types of glaucoma (open angle, narrow angle, congenital, secondary, and normal tension), the final common pathway for vision loss is injury to the million plus individual nerve fibers that compose the optic nerve. These fibers carry the visual message to the brain.

The goal of glaucoma management is to lower the pressure to a level that does not damage the optic nerve. This "safe pressure" is different for different patients. In a large population the "safe" intraocular pressure is up to about 23. However, there are many individuals with pressures above 23 that never develop glaucomatous damage to their vision. These people are called ocular hypertensives, borderline glaucoma, or glaucoma suspects. Patients who develop glaucomatous damage with a pressure consistently below 23 have normal tension glaucoma. It is not the pressure level itself that is important but rather if that pressure level is causing injury to the optic nerve. Damage is diagnosed by watching for loss of nerve fibers and for the development of visual field defects.

The optic nerve has three important regions: the margin, the nerve fibers, and the cup. These are illustrated in **Figure 1**. The cup is the empty area in the optic nerve that enlarges as nerve fibers die. As pressure damage is done, the optic nerve fibers atrophy (die) and the cup enlarges. The optic nerve margin remains constant in size. The C/D (cup to disc) ratio increases as glaucoma damages the nerve. A C/D

of up to 0.3 is usually normal although larger C/D ratios may be normal in some individuals. A C/D ratio of 1.0 represents total loss of optic nerve fibers.

There are several ways to watch for optic nerve change. The most important are: optic nerve drawings, optic nerve photos, and optic nerve imaging. The simplest method is for the ophthalmologist to make a drawing of the optic nerve and note the size of the cup to disc ratio. Optic nerve photos are a much more exact way to document size and shape. Stereo photography of the nerve, which requires more skill, increases the accuracy of optic nerve documentation.

In recent years three new techniques of optic nerve imaging have become widely available. These are scanning laser polarimetry (GDx), confocal scanning laser ophthalmoscopy (Heidelberg Retinal Tomograph or HRT II), and optical coherence tomography (OCT).

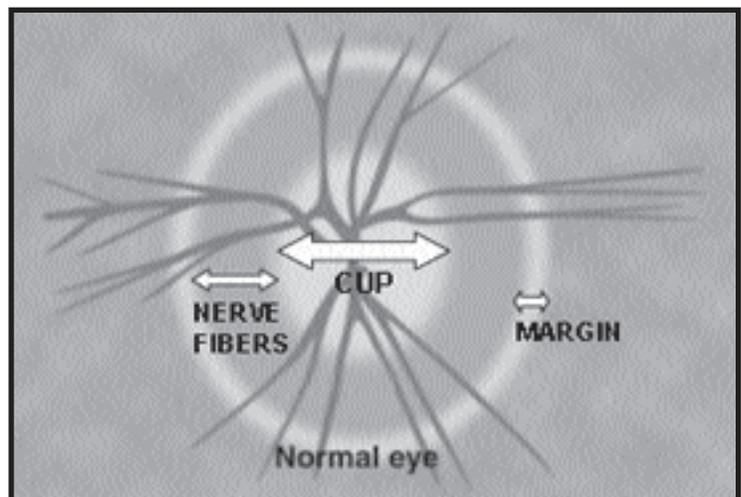


FIGURE 1

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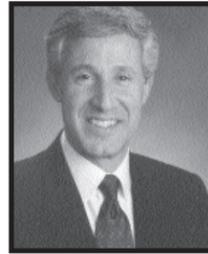
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## LETTER FROM OUR PRESIDENT & CEO



Dear Friends,

Thank you for making my first full year at the Glaucoma Research Foundation so fulfilling. It has been a great pleasure to get to know many of you who have contributed over the years to support our research and educational activities. Working closely with the Board, I see how committed they are to GRF with both their time and their money. And the dedication of our staff and volunteers is evidenced by the many kind comments we receive from those who have been helped.

Catalyst For a Cure scientists are enthusiastic about the results of the first phase of their research. They now have a working model to test possible target genes that could help to stop loss of vision from glaucoma. The CFC Scientific Advisory Board has been impressed with how much has been accomplished in the short time since the group came together to focus their research on finding a cure for glaucoma. And the GRF Board of Directors is committed to raising the funds to support this important work for another three years.

Thanks to you we've completed our year in excellent financial health. Several large bequests have enabled us to end the year well ahead of planned income. Please include GRF in your estate plans to continue to support our research and educational activities.

Sincerely,

Thomas M. Brunner  
President & CEO

## A FAMILY'S FUNDRAISER YIELDS SURPRISING RESULTS

Last spring, Dan and Maureen Fiarito got an idea.

From the time their daughter Danielle had been diagnosed with glaucoma six years ago, they had done everything to help maintain her vision and keep her intraocular pressure low - multiple medications, monitoring, and countless visits to ophthalmologists and specialists. "Anybody who has ever had a child, you feel their pain when they have a sniffle or cold. When it's vision-threatening, it takes on a whole new meaning," says Dan.

Still, after four years of treatment, at the age of eight, Danielle began a series of surgeries to maintain her sight, including the implant of a shunt and a trabeculoplasty. "We realized that even while we did everything we were supposed to be doing, we still had to go to surgery. We realized that the ultimate answer is a cure and that means increasing awareness and research," says Dan.

So Dan and Maureen hatched a plan - to hold a charity dinner and silent auction to raise funds for GRF and increase awareness of the disease that threatened the vision of Danielle, now ten years old. Together with Danielle, they started to solicit donations from restaurants and businesses in the Chicago area where they live. "At first I would go in with Danielle and I would do all the talking. But after a while, I let Danielle explain to business owners what we were doing and they were even more receptive," says Dan. "Danielle enjoyed it and we made it a family effort." Maureen wrote requests to sports teams and museums. The results were outstanding, with donations coming in from the Chicago White Sox, Bulls, Bears, and Cubs, as well as a number of Chicago museums. One anonymous donor even gave a Chicago Cubs litho of Ernie

Banks hitting his 500th home run. In all, the Fiaritos gathered about 100 auction items.

Meanwhile, they invited nearly 200 friends and family to the event, requesting a \$35 fee to cover costs or a contribution if they could not attend. They negotiated with a hall, arranged catering, created an auction catalogue and bid sheets, handcrafted centerpieces and handled every other detail. Danielle even hand made a unique bookmark for each guest's gift bag (which also included GRF educational materials). "We worked hard to save money where we could so as much of the money as possible could go toward research," says Maureen.

On the night of the event, about 100 people attended. Auction bidding was active. Dinner was delicious. Desserts donated by the guests were scrumptious. Danielle's doctor gave a presentation. Danielle got up and thanked everyone. It was a success. "What was really so wonderful was the spirit that everyone brought to the event. They really wanted to be part of doing something that was right," says Dan.



From L-R: Dan and Maureen Fiarito, Danielle, her ophthalmologist, Dr. Michale Savitt and his wife, Hilary

*"A Family's Fundraiser Yields Surprising Results"*

But the big surprise came when it was time to do the accounting. The Fiaritos' event brought in \$10,000 for GRF -substantially more than anyone had dreamed of. And \$4,000 of that came in donations from family and friends who were unable to attend the event. "Danielle has been such an inspiration and we were just so thankful," says Maureen.

"Our experience taught us that this was really do-able," says Dan. "We want to hold another fundraiser in the future and we want other people to know they can do it too," he adds. "Clearly we feel that research is the answer and we hope that with efforts like this, they can arrive at a cure sometime in Danielle's lifetime."

Tom Brunner, President & CEO of GRF stated, "The Fiarito family showed what can be done when people are given the opportunity to help. The funds they raised will go directly to support our innovative research program, Catalyst For a Cure."

**IT'S NO SECRET  
GLAUCOMA  
RUNS IN FAMILIES!**

**TELL YOUR  
LOVED ONES  
TO GET A  
DETAILED  
EYE EXAM  
AND A  
VISUAL FIELD  
TEST ON A  
REGULAR BASIS.**

*"The Importance of the Optic Nerve in Glaucoma Management" continued from page 1*

The GDx machine does not actually image the optic nerve but rather it measures the thickness of the nerve fiber layer on the retinal surface just before the fibers pass over the optic nerve margin to form the optic nerve. The HRT II scans the retinal surface and optic nerve with a laser. It then constructs a topographic (3-D) image of the optic nerve including a contour outline of the optic cup. The nerve fiber layer thickness is also measured. The OCT instrument utilizes a technique called optical coherence tomography which creates images by use of special beams of light. The OCT machine can create a contour map of the optic nerve, optic cup and measure the retinal nerve fiber thickness. Over time all three of these machines can detect loss of optic nerve

fibers.

Observing the optic nerve for loss of fibers is one of the most important parameters to monitor in glaucoma. The choice of how to do this best in the individual patient is determined by the ophthalmologist. There is no one best way. Long term monitoring of the intraocular pressure, visual field and optic nerve will allow for the best control of glaucoma and preservation of vision.



*Steven Litinsky, MD,  
Former Shaffer Fellow  
Glaucoma Specialist  
practicing in  
Delray Beach, Florida*

## CONTRIBUTIONS HONOR DOCTORS

Contributions to glaucoma research are often made to recognize a doctor's scientific interest and to acknowledge the care and friendship from a long term relationship. In fact the Glaucoma Research Foundation got its start when two long time patients of Dr. Robert Shaffer left million dollar bequests to honor their doctor and encourage research to find better treatments for glaucoma.

Personal relationships between doctor and patient often develop with life long conditions like glaucoma. Even in today's busy glaucoma practices, doctors strive to treat each patient as an individual, recognizing that the better informed a patient is, the more likely instructions will be followed and vision preserved.

A recent survey of GLEAMS recipients showed that most were well informed about glaucoma and understood the importance of lowering eye pressure. Respondents also reported that their doctor was their primary source of information about glaucoma. And, not surprising, of those respondents who changed doctors, the primary reason was poor communication.

Communication between doctor and patient takes many forms. In a brief office visit it is sometimes difficult to get questions answered and have time for any personal exchange. Bringing important questions to your visit in writing can help insure they are answered and not forgotten. And if you want to thank your doctor, but simply never seem to find the right moment, consider a gift in his or her honor to the Glaucoma Research Foundation.

We will inform your doctor that you honored him or her with your gift to the Glaucoma Research Foundation to further the research and educational activities of GRF. Your donation is a way to express your appreciation and at the same time help with the battle against glaucoma. Your support enables GRF to provide research grants and to increase awareness of glaucoma to preserve vision.

Scientists working to discover better ways to save vision are funded from donations made to honor a doctor for his or her care. The Glaucoma Research Foundation, over its 26 year history, has provided research grants totaling more than \$15 million to support glaucoma research. Important discoveries like identifying one of the genes that leads to juvenile glaucoma have resulted. Other GRF studies have proven the benefit of lowering eye pressure to preserve vision.

Return the enclosed envelope with your donation and the name and address of your doctor so we can inform him or her of your gift. Thank you for honoring your doctor and for your support of the activities of the Glaucoma Research Foundation.



*Dr. Robert Shaffer's  
dedication to his  
patients prompted the  
bequests that led to  
the founding of GRF.*

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GLAUCOMA V22.1 SEPT 2004

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