

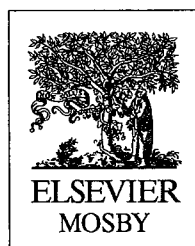
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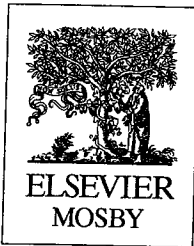
# The Year Book of OPHTHALMOLOGY®

Editor-in-Chief

**Christopher J. Rapuano, MD**

*Professor of Ophthalmology, Jefferson Medical College of Thomas Jefferson University; Co-Director, Cornea Service; Co-Director, Refractive Surgery Department, Wills Eye Hospital, Philadelphia, Pennsylvania*





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**2008 EDITION**

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Printed in the United States of America  
Composition by TnQ Books and Journals Pvt Ltd, India  
Printing/binding by Sheridan Books, Inc.

Editorial Office:  
Elsevier  
1600 John F. Kennedy Blvd.  
Suite 1800  
Philadelphia, PA 19103-2899

International Standard Serial Number: 0084-392X  
International Standard Book Number: 978-1-4160-5164-0

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*The Noel and Sara L. Simmonds Medical College of Thomas Jefferson University; Director, Cornea Service, Wills Eye Hospital, Philadelphia, Pennsylvania*

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**Richard Tipperman, MD**

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**James F. Vander, MD**

*Clinical Professor of Ophthalmology, Jefferson Medical College; Attending Surgeon, Retina Service, Wills Eye Hospital, Philadelphia, Pennsylvania*

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*Professor of Radiology and Rehabilitation Medicine, Thomas Jefferson University, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania*

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*Director, Glaucoma Service Diagnostic Laboratory; Assistant Professor, Thomas Jefferson University; Associate Attending, Glaucoma Service, Wills Eye Hospital, Philadelphia, Pennsylvania*

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*Assistant Professor, Jefferson Medical College of Thomas Jefferson University; Co-Director Oculoplastic Department; Attending Physician, Wills Eye Hospital, Philadelphia, Pennsylvania*

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#### **James F. Vander, MD**

*Clinical Professor Ophthalmology, Thomas Jefferson University; Attending Surgeon, Retina Service, Wills Eye Hospital, Philadelphia, Pennsylvania*

Editorial Assistant  
**Jeanette Armentani**

Contributors  
**Jeffery D. Henderer, MD**  
**L. Jay Katz, MD**  
**Rachel K. Sobel MD**

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To facilitate the use of the YEAR BOOK OF OPHTHALMOLOGY® as a reference tool, all illustrations and tables included in this publication are now identified as they appear in the original article. This change is meant to help the reader recognize that any illustration or table appearing in the YEAR BOOK OF OPHTHALMOLOGY® may be only one of many in the original article. For this reason, figure and table numbers will often appear to be out of sequence within the YEAR BOOK OF OPHTHALMOLOGY®.

## Foreword

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I am again thrilled that my Editor-in-Chief has accepted my job with the 2008 edition of the YEAR BOOK OF OPHTHALMOLOGY. Always, the goal of the YEAR BOOK OF OPHTHALMOLOGY is to present the most important peer-reviewed ophthalmic subspecialties from throughout the world, accompanied by brief discussion of the current state of the art by practicing ophthalmologists. I believe that this goal is being met.

With the ever expanding number of ophthalmic journals, it is difficult to keep up with the latest developments in all subspecialties. The YEAR BOOK OF OPHTHALMOLOGY fulfills that task and puts it into perspective. It does not have enough time to review the important developments in all subspecialties. The YEAR BOOK can't be beat for keeping you up to date in other sub-specialties.

I encourage readers to contact me at [willseye.org](mailto:willseye.org) with comments, criticisms, and suggestions. I will continue to help mold the YEAR BOOK OF OPHTHALMOLOGY for our readers. I look forward to hearing from you.

OPHTHALMOLOGY® as a reference tool, all publication are now identified as they is meant to help the reader recognize the YEAR BOOK OF OPHTHALMOLOGY® al article. For this reason, figure and of sequence within the YEAR BOOK OF

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## Foreword

I am again thrilled that my Editorial team has done such an outstanding job with the 2008 edition of the YEAR BOOK OF OPHTHALMOLOGY! As always, the goal of the YEAR BOOK is to provide a concise summary of the most important peer-reviewed journal articles covering the span of ophthalmic subspecialties from the previous year. The summary is accompanied by brief discussion of the relevance (or irrelevance) of the paper to practicing ophthalmologists. I believe it does just that!

With the ever expanding number of peer-reviewed journals, not to mention “throw-away” journals, it is getting harder and harder to not only keep up with the latest developments, but also to sift through the literature to find what is important. The YEAR BOOK OF OPHTHALMOLOGY accomplishes that task and puts it into perspective. For those of us with hardly enough time to review the important literature in our own sub-specialties, the YEAR BOOK can't be beat for keeping us abreast of the significant issues in other sub-specialties.

I encourage readers to contact me (via e-mail is the best, at [cjrapuano@willseye.org](mailto:cjrapuano@willseye.org)) with comments, criticisms and suggestions. Your input continues to help mold the YEAR BOOK into what is most useful for our readers. I look forward to hearing from you.

Christopher J. Rapuano, MD

open-angle glaucoma randomized to timolol (n = 129) or no immediate treatment for up to 11 years.

Secondary analyses, expressed by hazard ratios (HRs) and 95% confidence intervals (CIs).

Progression, defined by perimetric

as 67% when follow-up ended approximately halved progression risk. Results were similar for patients with higher IOP, exfoliation, bilateral disease reported. New baseline predictors of progression were lower systolic perfusion pressure in all patients (HR, 1.04–1.94), cardiovascular disease history (HR, 1.04–1.94) in patients with higher baseline IOP (HR, 1.25; 95% CI, 1.01–1.55 per 40  $\mu$ m lower) but not lower baseline IOP, with significant IOP–CCT interaction.

average increase per millimeter of mercury in all patients (HRs, 1.12–1.13 per mmHg higher) and similar results in patients with higher and lower baseline IOP (HRs, 1.15 and 1.13 per mmHg higher). Disc hemorrhages (HR, 1.02; 95% CI, 1.01–1.03 per percent higher frequency) also predicted progression. Thinner central corneal thickness (CCT) (HR, 1.25; 95% CI, 1.01–1.55 per 40  $\mu$ m lower) was a new significant factor, a result observed in patients with higher baseline IOP (HR, 1.42; 95% CI, 1.05–1.92 per 40  $\mu$ m lower) but not lower baseline IOP, with significant IOP–CCT interaction.

**Conclusions.**—Treatment and follow-up IOP continued to have a marked influence on progression, regardless of baseline IOP. Other significant factors were age, bilaterality, exfoliation, and disc hemorrhages, as previously determined. Lower systolic perfusion pressure, lower systolic BP, and cardiovascular disease history emerged as new predictors, suggesting a vascular role in glaucoma progression. Another new factor was thinner CCT, with results possibly indicating a preferential CCT effect with higher IOP (Table 2).

► Treatment of glaucoma in this trial halved the progression risk. Baseline progression risk factors were as follows: Higher IOP, exfoliation, bilateral disease, older age, low ocular systolic perfusion pressure, cardiovascular disease, and thinner corneal pachymetry. Post-baseline progression factors were as follows: IOP level (12% increase per mm Hg) and disc hemorrhages. These are in concordance with findings from other major glaucoma trials and support the use of these in the clinical management of patients with glaucoma.

L. J. Katz, MD

Table 2. Progression in the Early Manifest Glaucoma Trial (n = 255)

Factor	Hazard Ratio (95% Confidence Interval)	P Value*
Baseline IOP	0.53 (0.39–0.72)	<0.0001
Baseline IOP	1.77 (1.29–2.43)	0.0005
Baseline IOP	2.12 (1.30–3.46)	0.0026
Baseline IOP	1.88 (1.35–2.63)	0.0002
Baseline IOP	1.51 (1.11–2.07)	0.0095
Baseline IOP	1.42 (1.04–1.94)	0.0268
Baseline IOP	1.39 (1.00–1.91)	0.0510
Baseline IOP	0.69 (0.44–1.07)	0.0971
Lower IOP	0.92 (0.89–0.96)	0.0001
Higher IOP	1.13 (1.08–1.18)	<0.0001
Higher IOP	1.12 (1.07–1.16)	<0.0001
Higher IOP	1.02 (1.01–1.02)	0.0014
Lower IOP	1.25 (1.01–1.55)	0.0422

\*P values for interaction with baseline IOP, lower systolic perfusion pressure, baseline IOP, exfoliation, number of eligible eyes, age, and lower IOP at last follow-up visit and (d), (e) for mean follow-up IOP.

\*P values for interaction with baseline IOP, lower systolic perfusion pressure, baseline IOP, exfoliation, number of eligible eyes, age, and lower IOP at last follow-up visit and (d), (e) for mean follow-up IOP.

### Early detection of glaucoma by means of a novel 3D computer-automated visual field test

Nazemi PP, Fink W, Sadun AA, et al (Doheny Eye Inst and Keck School of Medicine at the Univ of Southern California, Los Angeles; et al) *Br J Ophthalmol* 91:1331–1336, 2007

**Purpose.**—A recently devised 3D computer-automated threshold Amsler grid test was used to identify early and distinctive defects in people with suspected glaucoma. Further, the location, shape and depth of these field defects were characterized. Finally, the visual fields were compared with those obtained by standard automated perimetry.

**Patients and Methods.**—Glaucoma suspects were defined as those having elevated intraocular pressure (>21 mm Hg) or cup-to-disc ratio of >0.5. 33 patients and 66 eyes with risk factors for glaucoma were examined. 15 patients and 23 eyes with no risk factors were tested as controls. The recently developed 3D computer-automated threshold Amsler grid test was used. The test exhibits a grid on a computer screen at a preselected

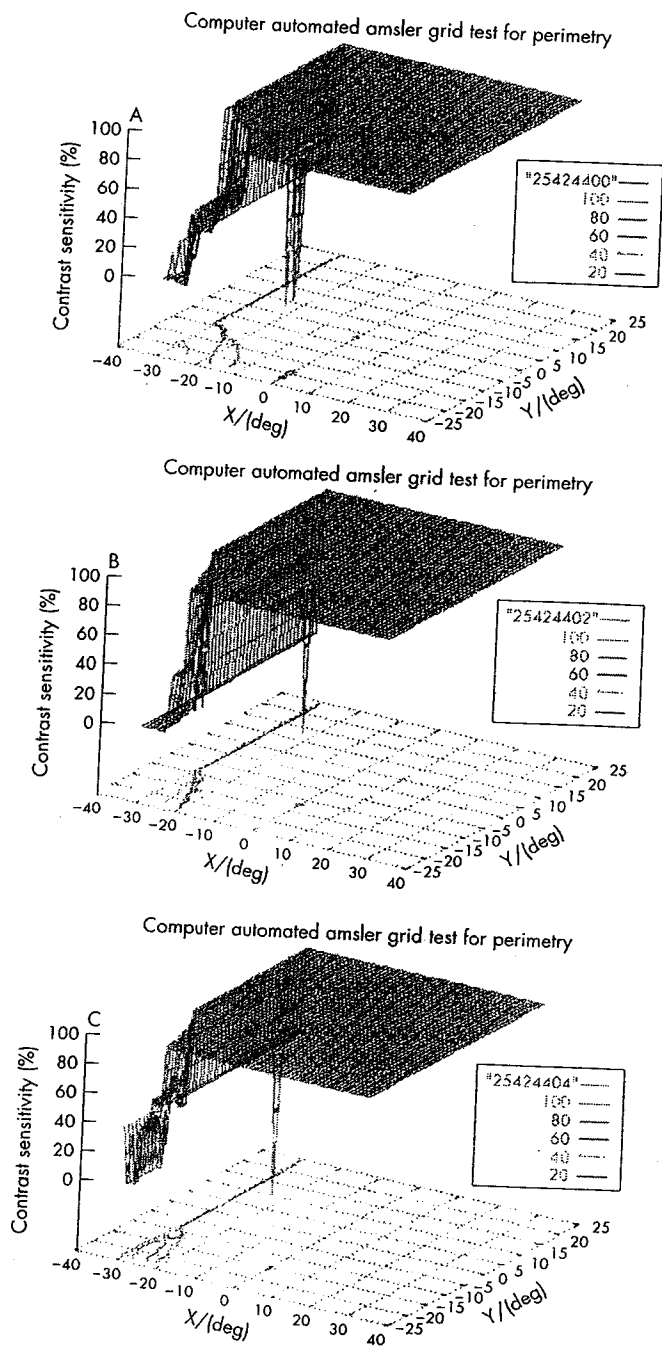


FIGURE 6.—A–C. Three repeated measurements of the same eye in a patient with inferior nasal step demonstrating the reproducibility of the 3D visual field test. (Reprinted from Nazemi PP, Fink W, Sadun AA, et al. Early detection of glaucoma by means of a novel 3D computer-automated visual field test. *Br J Ophthalmol.* 2007;91:1331-1336.)

greyscale and angular resolution, on the grid that are missing in the minute test required that the patient use a touch screen with varied displacement of gaze on a central fixation marker. The results were compared to Humphrey standard or SITA standard 30-2 or

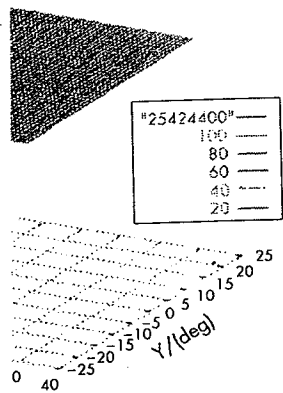
**Results.**—In this pilot study 79 suspect group repeatedly demonstrated arcuate defects in the eyes demonstrated arcuate defects were shown in 29% of the detected in the control group.

**Conclusions.**—The 3D computer may demonstrate visual field abnormalities in glaucoma suspects with normal acuity. This test may be used as a screening test for glaucoma (Fig 6).

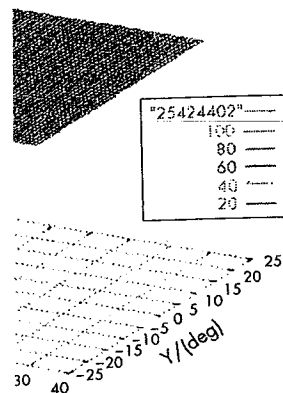
► Current visual field testing is not particularly sensitive to early glaucoma. Attempts to overcome one or more of the limitations of the test are being made. This new test varies contrast to test the field and render a 3D reconstruction of the visual field. The test is a sensitive computer screen. The test is performed at contrast levels during 3 to 5 minutes. The control group and normal patients, were asked to perform Humphrey perimetry. The control group had no defects. In the glaucoma suspect group, 79% of the defects were not apparent on Humphrey perimetry and typical of glaucoma. This pilot study suggests that defects would eventually become apparent. It is able to compare the test with the Humphrey test. The wavelength perimetry or frequency doubling perimetry of the test is that it is probably much more sensitive. It still relies on the patient's cooperation. It is not an easy enough stylus to outline some scotomas. The test is difficult for some subjects. It is a promising field testing strategy that could be used for screening and for the disease.



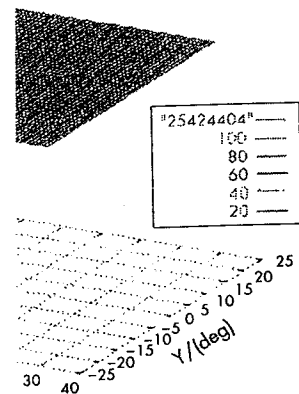
ler grid test for perimetry



sler grid test for perimetry



sler grid test for perimetry



of the same eye in a patient with inferior nasal step  
ld test. (Reprinted from Nazemi PP, Fink W, Sadun  
novel 3D computer-automated visual field test. *Br J*

greyscale and angular resolution, and allows patients to trace those areas on the grid that are missing in their visual field using a touch screen. The 5 minute test required that the patients repeatedly outline scotomas on a touch screen with varied displays of contrast while maintaining their gaze on a central fixation marker. A 3D depiction of the visual field defects was then obtained that was further characterised by the location, shape and depth of the scotomas. The exam was repeated three times per eye. The results were compared to Humphrey visual field tests (ie, achromatic standard or SITA standard 30-2 or 24-2).

**Results.**—In this pilot study 79% of the eyes tested in the glaucoma-suspect group repeatedly demonstrated visual field loss with the 3D perimetry. The 3D depictions of visual field loss associated with these risk factors were all characteristic of or compatible with glaucoma. 71% of the eyes demonstrated arcuate defects or a nasal step. Constricted visual fields were shown in 29% of the eyes. No visual field changes were detected in the control group.

**Conclusions.**—The 3D computer-automated threshold Amsler grid test may demonstrate visual field abnormalities characteristic of glaucoma in glaucoma suspects with normal achromatic Humphrey visual field testing. This test may be used as a screening tool for the early detection of glaucoma (Fig 6).

► Current visual field testing is not optimal. It relies on the patient's cooperation, is not particularly sensitive to early glaucoma, and it is not portable. Several attempts to overcome one or more of these shortcomings have resulted in novel ways to test the field. A recent computer-based field test is one such example. This new test varies contrast to test the central vision in an Amsler grid fashion and render a 3D reconstruction of the hill of vision. The patient fixates on a central target and outlines any scotomas with his or her finger on a touch-sensitive computer screen. The test is repeated 5 times with varying preset contrast levels during 3 to 5 minutes time. Two groups, glaucoma suspects and normal patients, were asked to take both this test and conventional Humphrey perimetry. The control group of normal patients all had normal fields. In the glaucoma suspect group, 79% of eyes had field defects on the new test that were not apparent on Humphrey perimetry. The defects were reproducible and typical of glaucoma. This pilot study was not able to determine if the defects would eventually become apparent on Humphrey perimetry, nor was it able to compare the test with the results of other field strategies like short wavelength perimetry or frequency doubling perimetry. The other advantage of the test is that it is probably much more portable than conventional perimetry. It still relies on the patient's cooperation and I wonder if a finger is a fine enough stylus to outline some scotomas. Although those issues might make the test difficult for some subjects, overall though this seems to be a very promising field testing strategy that could very well help in the care of glaucoma and screening for the disease.

J. D. Henderer, MD