

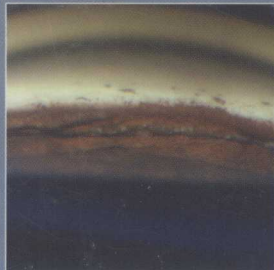
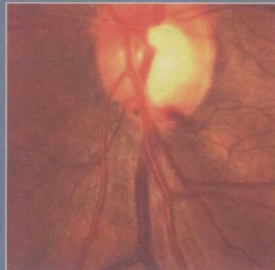
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Second Edition | Volume One

GLAUCOMA

Medical Diagnosis & Therapy



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GLAUCOMA

Medical Diagnosis & Therapy

SECOND EDITION

VOLUME ONE

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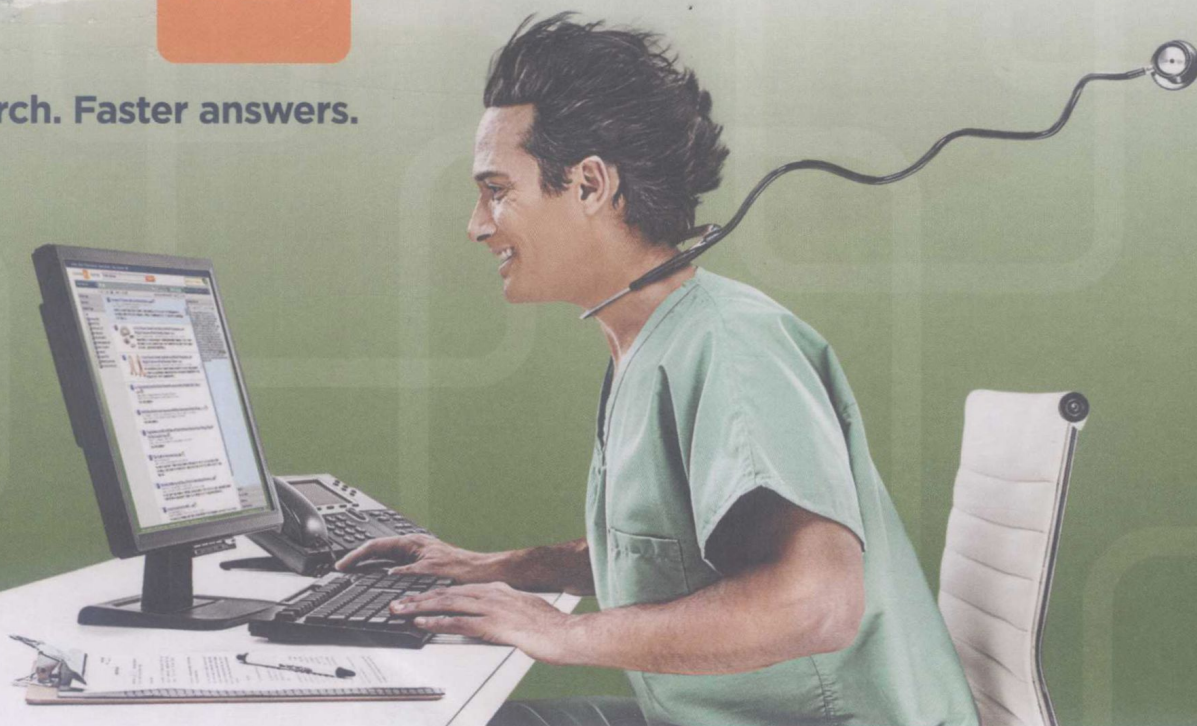
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GLAUCOMA

First Edition Foreword

In spite of the widespread use of the internet, there seems to be a need for a book that reports on the current philosophy of glaucoma and explores the boundaries of its many subjects. The Editors, who are among the leaders in glaucoma field, have demonstrated their competence by choosing some of the best people to write the chapters for both volumes. This first volume deals with the non-surgical aspects of glaucoma. Reading some of the chapters, I was not surprised by the advances that have occurred since the last book of this kind was compiled. The chapter on the molecular biology of our genetic knowledge is a good example of the explosion of our knowledge, but we are not anywhere near the time when the genetics of the elevated intraocular pressure are known and we are quite in the dark of the genetics of the many other risk factors at play in this multifactorial disease. Quoting from the book 'It is now clear that glaucoma has wide genetic heterogeneity with no single gene accounting for all cases of any single glaucoma phenotype. In other words, alterations in different genes can lead to the same phenotype while in other cases variants in the same gene may lead to different phenotypes.' We are still far away 'from the time when it will be possible to predict at birth what ailments we are prone to and whether glaucoma is on the cards for the individual.' We are also much more aware of geographical differences in the disease and of the economic imperatives which affect many aspects of the disease. The philosophy of screening, the pathogenesis of the diseases, the role of the vascular factors, the definition of the disease and its diagnosis, the ever more sophisticated diagnostic tools available, the many types of glaucoma and their managements as well as the medical agents are all included. The recognition that there are risk factors, in addition to intraocular pressure, for the development of glaucoma and its progression have not yet fully found their way into clinical practice. We remain surprised when patients with major reduction of their IOP either continue to progress or start to progress again later

in their lives. I know that under these circumstances the further reduction of the pressure in the eye is usually contemplated before considering whether there are other risk factors responsible for the progression. It is often stated, that nothing can be done about these other, non pressure, risk factors. Some of these other risk factors can be controlled or treated at present providing they are looked for and recognized. We do not have evidence-based knowledge that their control and treatment favorably affects the disease. If we channeled a fraction of our effort and resources to the entire disease, instead of channeling them almost entirely to IOP and its control, rapid progress would be made. Both of the controlled clinical trials, CNTGS and EMGT, which followed, for the first time, untreated glaucoma patients over fairly long periods of time make it clear that the course of untreated glaucoma is variable. Half of the untreated newly diagnosed patients with NTG showed no progression over a 5- to 8-year period. In the EMGT in patients with IOPs between 21 and 30 mmHg the number of untreated patients who did not progress was still 20%. It is not difficult to identify those patients in whom the disease progresses rapidly which would endanger their future visual well being. They clearly require appropriate treatment. On the other hand those in whom we can not identify current progression or find progression which is so slow as not to endanger their visual competence in their predicted life span probably require a different management. This is not currently widely practiced even though the information from the CNTGS and the EMGT have been in the public domain for quite a long time. One of my former fellows often said 'everybody writes but nobody reads'. While this is an amusing exaggeration I know that this comprehensive book will deserve to be read widely.

Stephen M Drance, OC MD
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Preface

The first edition of "Glaucoma" was published 5 years ago and almost instantly found its place as a comprehensive tool for glaucoma surgeons and general ophthalmologists alike. It has been praised by our peers and has received excellent reviews. Five years on we are both thankful to our colleagues and humbled by their kind words. Never the less, we continually aspire to build on feedback received and commit to keeping current and comprehensive. It is evident that the last 5 years have seen important strides in the accumulated knowledge about glaucoma, and, in this day and age, it is imperative to keep up-to-date.

We are proud to present a second edition that is more encompassing and that expands on novel features, namely the spotlights, which make it both appealing and user friendly. In these concise cameos, not only do we aim to present the point of view of a chapter author but, whenever there is room for controversy, evidence-based counterpoints are proposed as well. We were able to draw in many experts in the field offering a podium to ponder specific points of view and challenging ideas.

As skill transfer becomes more accessible with the convenience of the Internet, a significant update of the book's video content was particularly important to our readers. We are confident that doubling the number of video clips in the second edition will be valuable.

As with the first edition, our efforts have been intelligently channelled by Russell Gabbedy, and joined, for the second edition by Alexandra Mortimer, Humayra Rahman Khan and Umarani Natarajan of Elsevier who, through a lot of time and energy, have guided and positively encouraged the whole process. We are forever in their debt.

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Ch 35 Secondary Angle-Closure Glaucoma

Ch 41 Glaucoma in the Phakomatoses and Related Conditions

J Crawford Downs, PhD

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Ch 8 Mechanical Strain and Restructuring of the Optic Nerve Head

Video 8-1 Laminar Microstructure Deformation

Gordon N Dutton, FRCS FRCOphth MD

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Ch 57 Fixed Combination Therapies in Glaucoma

Hassan Eldaly, MBBS MSc Ophth

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Ch 10 Spotlight: Tonometry and Intraocular Fluctuation

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Professor of Ophthalmology, Director of El Sayyad Eye Center, Cairo, Egypt

Ch 83 Trabeculectomy Related Corneal Complications

Video 83-1 Surgical Excision of Cornealized Bleb

Benedetto Falsini, MD

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Ch 24 Spotlight: Practicalities

The late Francisco Fantes, MD

Formerly Professor of Clinical Ophthalmology, Bascom Palmer Eye Institute, University of Miami, Miami, FL, USA

Ch 93 Complications Associated with Modulation of Wound Healing in Glaucoma Surgery

Herbert P Fechter III, MD PE

Assistant Professor, Uniformed Services University; Private Practice, Eye Physicians and Surgeons of Augusta, Augusta, GA, USA

Ch 93 Complications Associated with Modulation of Wound Healing in Glaucoma Surgery

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Ch 29 Primary Open-Angle Glaucoma

Ronald L Fellman, MD

Attending Surgeon and Clinician, Glaucoma Associates of Texas; Associate Clinical Professor Emeritus, University of Texas Southwestern Medical Center, Dallas, TX, USA

Ch 77 Trabeculectomy

Video 77-1 Trabeculectomy with Fornix-based Conjunctival Flap – Clip One

Video 77-2 Trabeculectomy with Fornix-based Conjunctival Flap – Clip Two

Video 77-3 Trabeculectomy Closure

Video spotlight 127-1 Canaloplasty: Circumferential Viscodilation and Suture Tensioning of Schlemm's Canal

Video spotlight 128-6 GATT: Gonioscopy Assisted Transluminal Trabeculotomy

Eva Fenwick, PhD

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Ch 46 Spotlight: Evaluation of Quality of Life

Arosha Fernando, MRCOphth

Specialist Registrar, Moorfields Eye Hospital, London, UK

Video spotlight 118-1 Aqueous Shunts after Retinal Surgery

Ann Caroline Fisher, MD

Clinical Assistant Professor, Department of Ophthalmology, Byers Eye Institute, Stanford University School of Medicine, Stanford, CA, USA

Ch 92 Technique

Frederick W Fitzke, PhD

Professor of Visual Optics and Psychophysics, Division of Visual Science, UCL Institute of Ophthalmology, University College London, London, UK

Ch 65 Ultrastructural Imaging

Brad Fortune, OD PhD

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Ch 14 Electrophysiology in Glaucoma Assessment

Paul Foster, PhD FRCS(Ed) FRCOphth

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Ch 30 Primary Angle-Closure Glaucoma

Panayiota Founti, MD PhD

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Ch 46 Quality of Life

Jeffrey Freedman, MB BCh PhD FRCS(Edin) FCS(SA)

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Ch 109 Preoperative Evaluation of Patients Undergoing Drainage Implant Surgery

Stefano A Gandolfi, MD

Full Professor of Ophthalmology and Chairman, University Eye Clinic, University of Parma, Parma, Italy

Ch 32 Pigmentary Glaucoma

Ch 101 Spotlight: Nonpenetrating Surgery: When is this my Preferred Option?

Julián García-Feijoó, MD PhD

Professor and Chairman, Department of Ophthalmology, Instituto de Investigación, Hospital Clínico San Carlos, Universidad Complutense, Oftared, Madrid, Spain

Ch 128 Spotlight: Combined Trabecular Micro-Bypass Stent Implantation and Phacoemulsification

David Garway-Heath, MD FRCOphth

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Ch 10 Tonometry and Intraocular Pressure Fluctuation

Gus Gazzard, MD

Honorary Senior Lecturer and Consultant Ophthalmic Surgeon, Glaucoma Service, Moorfields Eye Hospital, London, UK

Ch 17 Angle Imaging: Ultrasound Biomicroscopy and Anterior Segment Optical Coherence Tomography

Video 17-1 360° Angle Evaluation with Anterior Segment Optical Coherence Tomography

Steven J Gedde, MD

Professor of Ophthalmology, Bascom Palmer Eye Institute, University of Miami School of Medicine, Miami, FL, USA

Ch 84 Aqueous Misdirection

Ch 117 Spotlight: TVT Study

Noa Geffen, MD

Ophthalmologist, Department of Ophthalmology, Meir Medical Center, Kfar-Saba; Ein-Tal Eye Center, Tel-Aviv, Israel

Ch 97 Spotlight: CO₂ Laser Assisted Sclerectomy Surgery (CLASS) for Open-Angle Glaucoma Treatment

Stelios Georgoulas, MD PhD

Specialist Trainee in Ophthalmology, National Institute for Health Research (NIHR) Biomedical Research Centre, Moorfields Eye Hospital NHS Foundation Trust and UCL Institute of Ophthalmology, London, UK

Ch 95 Future Strategies

Annette Giangiacomo, MD

Assistant Professor, Department of Ophthalmology, Emory University, Atlanta, GA, USA

Ch 34 Childhood Glaucomas

Katie Gill, BSc MSc

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Ch 63 Spotlight: Brain Perspective

Zisis Gkatzoufas, MD PhD

Assistant Professor, Geneva University Hospitals HUG, Department of Ophthalmology, Geneva, Switzerland

Ch 18 Spotlight: What a Glaucoma Specialist Needs to Know About Corneal Biomechanics

Ch 18 Spotlight: New Technology to Look at Corneal Biomechanics in Clinic

Ivan Goldberg, AM MBBS(Syd) FRANZCO FRACS

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Ch 50 Outcomes

Ch 71 Spotlight: Long-Term Effects

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Ch 123 Spotlight: PHACO-ECP

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Ch 14 Electrophysiology in Glaucoma Assessment

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Ch 121 Further Surgical Options in Children

David S Greenfield, MD

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Video spotlight 82-1 Drainage of Choroidal Effusion

Franz Grehn, MD PhD

Chairman and Professor, Department of Ophthalmology, University Hospitals Würzburg, Würzburg, Germany

Ch 104 Cataract Surgery in Patients with Functioning Filtering Blebs

Video spotlight 120-2 Classical Trabeculotomy

Video spotlight 120-3 360° Trabeculotomy Using an Illuminated Catheter

Daniel E Grigera, MD

Head, Glaucoma Service, Hospital Oftalmológico Santa Lucía, Assistant Professor of Ophthalmology, Universidad del Salvador, Buenos Aires, Argentina

Ch 101 Results of Nonpenetrating Glaucoma Surgery

Ronald L Gross, MD

Jane McDermott Schott Chair, Professor and Chairman, Department of Ophthalmology, Director, WVU Eye Institute, West Virginia University School of Medicine, Morgantown, WV, USA

Ch 115 Intraoperative Complications

Davinder S Grover, MD MPH

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Ch 77 Trabeculectomy

Video 77-1 Trabeculectomy with Fornix-based Conjunctival Flap – Clip One

Video 77-3 Trabeculectomy Closure

Video spotlight 128-6 GATT: Gonioscopy Assisted Transluminal Trabeculotomy

Rafael Grytz, PhD

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Ch 8 Mechanical Strain and Restructuring of the Optic Nerve Head

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Fellow in Vitreoretinal Surgery, New York Eye and Ear Infirmary, New York, NY, USA

Ch 76 Ophthalmic Anesthesia

Neeru Gupta, MD PhD MBA FRCSC DipABO

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Ch 5 Spotlight: Lymphatics and Uveolymphatic Outflow from the Eye

Carlos Gustavo de Moraes MD

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Ch 114 Other Glaucoma Implants

Ali S Hafez, MD PhD

Assistant Clinical Professor of Ophthalmology, University of Montreal; Assistant Professor of Ophthalmology, McGill University Health Center; Attending Ophthalmologist, Sacre-Coeur Hospital, Maisonneuve Rosemont Hospital, Montreal General Hospital, Montreal, QC, Canada
Ch 9 Role of Ocular Blood Flow in the Pathogenesis of Glaucoma
Ch 24 Techniques Used for Evaluation of Ocular Blood Flow

Farhad Hafezi, MD PhD

Professor and Chair of Ophthalmology, Department of Ophthalmology, Geneva University Hospitals HUG, Geneva, Switzerland
Ch 18 Spotlight: What a Glaucoma Specialist Needs to Know About Corneal Biomechanics

Teruhiko Hamanaka, MD PhD

Director of Ophthalmology, Japanese Red Cross Medical Center, Department of Ophthalmology, Tokyo, Japan
Ch 78 Spotlight: Histology of the Mature Functioning Bleb

Alon Harris, MS PhD FARVO

Professor of Ophthalmology, Professor of Cellular and Integrative Physiology, and Director Clinical Research, Glick Eye Institute, Department of Ophthalmology, Indiana University Medical Center, Indianapolis, IN, USA
Ch 24 Spotlight: Value of Blood Flow in Studies

Marcelo Hatanaka, MD

Head of Glaucoma Service, Department of Ophthalmology, University of São Paulo Medical School, São Paulo, Brazil
Ch 114 Other Glaucoma Implants

Matthew J Hawker, DM FRCOphth

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Ch 75 Preoperative Conjunctival Health and Trabeculectomy Outcome

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Ch 2 Screening for Glaucoma

The late Catherine J Heatley, MRCOphth

Ophthalmologist, Moorfields Eye Hospital, London, UK
Video spotlight 112-1 Baerveldt Implantation without Ligation
Video spotlight 116-2 Blocked Tube and Ahmed Extender

Dale K Heuer, MD

Professor & Chairman of Ophthalmology, Medical College of Wisconsin; Director, Froedtert & Medical College of Wisconsin Eye Institute, Milwaukee, WI, USA
Ch 110 Aqueous Shunts: Choice of Implant

Eve J Higginbotham, SM MD

Vice Dean, Perelman School of Medicine; Senior Fellow, Leonard Davis Institute of Health Economics; Professor, Scheie Eye Institute, University of Pennsylvania, Philadelphia, PA, USA
Ch 71 Spotlight: Laser Trabeculoplasty: A Patient-Centred View

Cornelia Hirn, MD FEBO

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Ch 10 Tonometry and Intraocular Pressure Fluctuation

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Ch 42 Management of Ocular Hypertension and Primary Open-Angle Glaucoma

Gábor Holló, MD PhD DSc

Professor of Ophthalmology, Department of Ophthalmology, Semmelweis University, Budapest, Hungary
Ch 54 Carbonic Anhydrase Inhibitors

Ann M Hoste, MD

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Ch 53 Beta-Blockers

Andrew Huck, BS

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Ch 24 Spotlight: Value of Blood Flow in Studies

Cindy ML Hutnik, MD PhD

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Ch 71 Spotlight: First Line Treatment with Laser SLT

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Ch 34 Childhood Glaucomas

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Ch 58 Ocular Surface Disease and the Role of Preservatives in Glaucoma Medications

Farrah Ja'afar, MD

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Ch 1 Spotlight: What Prevalence and Geographic Variations Tell Us?

Henry Jampel, MD MHS

Odd Fellows Professor of Ophthalmology, Johns Hopkins University School of Medicine, Wilmer Eye Institute, Baltimore, MD, USA

Ch 45 Spotlight: Pros and Cons of Using Target Pressures in Clinical Practice

Thomas V Johnson, PhD

MD Candidate, Johns Hopkins School of Medicine, Baltimore, MD, USA

Ch 63 Stem Cells: A Future Glaucoma Therapy?

Jost B Jonas, MD

Professor of Ophthalmology and Chairman, Department of Ophthalmology, Medical Faculty Mannheim of the Ruprecht-Karls-University Heidelberg, Mannheim, Germany

Ch 1 Spotlight: China Study

Ch 19 Optic Disc Photography in the Diagnosis of Glaucoma

Malik Y Kahook, MD

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Ch 58 Ocular Surface Disease and the Role of Preservatives in Glaucoma Medications

Ch 124 Complications of Cyclodestructive Procedures

Michael A Kass, MD

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Ch 28 Ocular Hypertension

Andreas Katsanos, MD PhD

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Ch 57 Fixed Combination Therapies in Glaucoma

L Jay Katz, MD FACS

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Ch 71 Spotlight: Selective Laser Trabeculoplasty

Jill E Keeffe, PhD

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Ch 48 Optimizing Quality of Life: Low-vision Rehabilitation in Glaucoma

Thomas Kersey, MD

Consultant Ophthalmologist, South Devon Hospital, Ophthalmology Department, Devon, UK

Ch 122 Cyclodestructive Techniques

Naira Khachatryan, MD PhD

Postdoc Employee, University of California, San Diego, Department of Ophthalmology, CA, USA

Ch 20 Optic Disc Imaging

Sir Peng Tee Khaw, PhD FRCS FRCOph FSB FRCP FRCPath FARVO FMedSci

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Ch 95 Future Strategies

Ch 120 Goniotomy and Trabeculotomy

Video spotlight 120-1 Goniotomy

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Ch 29 Primary Open-Angle Glaucoma

Dan Kiage, MD

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Ch 2 Spotlight: Screening in Africa

Lee Kiang, MD PhD

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Ch 3 Economics of Glaucoma Care

Daniel Kim, MD

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Ch 37 Neovascular Glaucoma

Yoshiaki Kiuchi, MD PhD

Professor and Chairman, Hiroshima University, Department of Ophthalmology and Visual Science, Hiroshima, Japan

Ch 33 Spotlight: Japanese Perspective