

Ulrich Spandau
Gabor Scharioth
Editors

Cutting Edge of Ophthalmic Surgery

From Refractive SMILE
to Robotic Vitrectomy

EXTRAS ONLINE

 Springer

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From Refractive SMILE to Robotic
Vitrectomy

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ISBN 978-3-319-47225-6 ISBN 978-3-319-47226-3 (eBook)
DOI 10.1007/978-3-319-47226-3

Library of Congress Control Number: 2016961517

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Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

In order to become a top surgeon you need to be a specialist in two areas: in your surgical field as well as in technical innovations. This book contains the most innovative and modern ocular surgery of the complete eye: from the eyelid to the retina. Only leading surgeons and pioneers in their field present their surgery with videos and detailed step-by-step instructions.

Lacrimal duct surgery has changed dramatically through the introduction of microendoscopes and microdrills allowing a much more refined surgery than the traditional DCR. The eye hospital in Darmstadt, Germany, is one of the worldwide leading clinics in lacrimal duct surgery. Dr. Ungerechts will describe his experiences with endoscopic lacrimal duct surgery.

SMILE stands for *small incision lenticule extraction* and is the most recent revolution in corneal refractive surgery. During the SMILE procedure, the femtosecond laser cuts a lenticule inside the corneal stroma which is removed by a side incision. A corneal flap with all the negative side effects is no longer necessary. This technique was developed by the company Zeiss together with Prof. Sekundo (Marburg, Germany), Prof. Blum (Erfurt, Germany), and Prof. Meyer (Cologne, Germany). The authors describe the development of this new technique and demonstrate the surgery step by step.

In 2015, the German glaucoma patient association declared *canaloplasty* as the new gold standard in glaucoma surgery, as this operation combines good results with a low risk profile. Prof. Körber from Cologne, Germany, is a pioneer in the surgery of canaloplasty. During this surgery, an illuminated microcatheter is introduced in Schlemm's canal and the canal is then widened through injection of viscoelastics. Prof. Scharioth from Recklinghausen, Germany, will demonstrate a novel technique for canaloplasty using a special suture from Onatec (Onalene, Germany).

Iris surgery has made a huge leap forward with the advent of a foldable iris prosthesis from Human Optics, Germany, and new iris instruments from Geuder, Germany. The iris prosthesis enables the treatment of aniridia with a 2.5 mm incision and the new instruments allow a simple surgery for traumatic mydriasis. Asst. Prof. Spandau will demonstrate the surgical techniques step by step and show several videos.

The most exciting development in *cataract surgery* is surely the advent of the laser. Prof. Nagy from Budapest, Hungary, is a developer of femtosecond cataract surgery. He will present his technique step by step and show the pros and cons of this exciting new surgery. Prof. Sauder from Stuttgart, Germany, will demonstrate a novel phaco handpiece which removes the nucleus with

laser instead of ultrasound. And finally, Dr. Nyström from Gothenburg, Sweden, will demonstrate congenital cataract surgery and implantation of a Tassignon IOL.

The amount of implanted *special lenses* has augmented dramatically in recent years. In this book, we will present two special lenses, the macula lens for improved reading ability and the add-on IOL. Prof. Scharioth from Recklinghausen, Germany, designed a novel macula lens which is implanted as a piggyback IOL and allows near vision for patients with AMD. Prof. Sauder from Stuttgart, Germany, will present the use and implantation of add-on IOLs for spherical, astigmatic, and presbyopic correction in pseudophakic eyes.

Glued IOL and the intrascleral IOL are the most common techniques for *secondary IOL implantations*. Prof. Scharioth from Recklinghausen, Germany, will present his famous technique of intrascleral IOL fixation and the modified glued IOL technique.

Vitreoretinal surgery has undergone dramatic changes in the last 10 years through the introduction of trocars. The most recent development is the advent of a new double-blade vitreous cutter (Geuder, Germany; Dorc, The Netherlands) which has a cutting rate of 16.000 cuts/min and simultaneous constant flow. Asst. Prof. Spandau from Uppsala, Sweden, will demonstrate 27G vitrectomy with a TDC cutter in pediatric patients – from ROP to FEVR.

Will *robotic surgery* be the future in ocular surgery? Dr. Charles Mango from New York, USA, will report on the latest state of robotic technology for eye surgery.

Ophthalmology has always been an innovative field. With constant development of technical innovations and surgical techniques, the potential for the future is unlimited.

Uppsala, Sweden
Recklinghausen, Germany

Ulrich Spandau
Gabor Scharioth

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<https://www.youtube.com/watch?v=oC400mW3yLY>

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<https://www.youtube.com/watch?v=SMi5TqWqBaU>
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About the Authors



Marcus Blum, MD Marcus Blum is chairman of ophthalmology at the Helios Klinikum Erfurt GmbH, Germany. He graduated from Heidelberg University Medical School and was a resident at the Department of Ophthalmology in Heidelberg. From 1995 onwards, he was Fellow at the University of Jena and was appointed associate professor. In 2001, he became head of department in Erfurt. He was clinical investigator for several new technologies and published more than 100 papers. Together with Walter Sekundo, he was the first surgeon to perform FLEx and SMILE with a femtosecond laser.



Jean-Pierre Hubschman, MD Jean-Pierre Hubschman is currently Associate Professor in Residence, Department of Ophthalmology, at the David Geffen School of Medicine – University of California Los Angeles (UCLA), Stein Eye Institute. Dr. Hubschman is also Chief of Retina at Olive View Medical Center at UCLA, and an Affiliate Faculty of the Bioengineering Department, Henry Samueli School of Engineering and Applied Science.

Jean-Pierre Hubschman is the author of more than 100 peer-reviewed papers, numerous book chapters, and the principal investigator or co-investigator of several grants including the NIH and NEI institutes.

Dr. Hubschman's research interest has focused, during the last 10 years on translational research in ophthalmology, specifically on robotics for ophthalmic surgery and surgical visualization improvement.



Norbert Körber, FEBO is born in 1952 in Germany. He finished his medical studies (1972–1978) 1979 with a PhD and 1984 he passed the exam as ophthalmologist. He is working in his own practice in Cologne since 1987; nowadays an ophthalmologic group practice with nine other colleagues. Since 20 years, he owns an ophthalmic outpatient surgery centre; a total of ten surgeons are performing surgery in the centre (approximately 6000 intra-ocular cases per year). He specializes in cataract and glaucoma surgery.

He showed scientific activities in microcirculation and hemorheology and published about cataract surgery, refractive surgery, and glaucoma surgery.

(In total more than 150 publications and presentations.)

As guest professor, he has been teaching at the University Eye Hospital in Padova, Italy, since 2002 and is honorary member of the AISG (Italian Society on Studies of Glaucoma). Further memberships are at ESCRS, ASCRS, DGII, board member of the BDOC, chairman of the VOA North Rhine, and fellow of the European Board of Ophthalmologists.

His operative spectrum covers cataract, refractive IOLs, glaucoma surgery, vitrectomy, and oculoplastic surgery.



Charles W. Mango, MD Dr. Charles W. Mango is a Clinical Associate Professor of Ophthalmology at the Weill Cornell Medical College. He is a board-certified ophthalmologist whose clinical practice involves the medical and surgical management of vitreoretinal disorders. He is actively involved as a teaching professor in the vitreoretinal fellowship training program at New York Presbyterian Hospital.

Dr. Mango completed a residency in Ophthalmology at the Weill Cornell Medical College – New York Presbyterian Hospital in New York. He has also completed a 2-year fellowship in vitreoretinal disease and surgery at the Jules Stein Eye Institute – University of California Los Angeles.

Dr. Mango serves on the editorial board for the official journal of the American Society of Retina Specialists. He has published and contributes as a reviewer to the major scientific journals. He has authored multiple textbook chapters. He is involved in several scientific research projects, which include robotic ocular surgery, retinal imaging modalities, and evaluation of electronic advances in the field of retina.

Dr. Mango has been a speaker and moderator at multiple national and international meetings. He has participated as a principal investigator and co-investigator in numerous clinical trials. Dr. Mango is a founder of the Vit-Buckle Society where he currently serves as an officer and executive board member.



Bertram Meyer, MD Dr. Bertram Meyer is specialist in laser refractive surgery since 1992 and is performing SMILE procedures since 2010. He works in private clinics in Cologne and in Dubai. He gives continuous and regular lectures and updates during the annual meetings of DOG, DOC, DGII, and European Society of Cataract and Refractive Surgeons (ESCRS) about Femto-Lasik and ReLEx® SMILE. He is member of Advisory Board for Refractive Laser Surgery for Carl Zeiss Meditec for many years.

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Sarah Mödl, FEBO is currently a fellow at the Eye Hospital Charlottenklinik in Stuttgart. She graduated from University of Ulm Medical School in 2010 and was afterwards a resident at Charlottenklinik. She performs cataract, oculoplastic and lacrimal surgery.



Zoltan Z. Nagy has been working in ophthalmology since 1986. Currently he is the Head of the Department of Ophthalmology Semmelweis University, Budapest, Hungary, and serves as a Dean of the Faculty of Health Sciences. His main interest in ophthalmology is cataract and refractive surgery.

He started refractive surgery first in Hungary in 1992, performed all kinds of refractive procedures: PRK, LASIK, epi-LASIK, LASEK, PTK, femto-LASIK, overall he operated more than 30,000 eyes with all kinds of refractive errors and more than 16,000 eyes with cataract. He discovered the role of harmful ultraviolet-B effect during corneal avascular wound healing, which has been published in *Ophthalmology* in 1997. He has published more than 139 articles in English and in Hungarian, contributed 5 books, and wrote 20 book chapters.

Dr. Nagy was the first who performed femtolaser-assisted cataract surgery in the world in 2008. He has published more than 22 papers, 1 book, and 5 book chapters regarding the clinical results of femtolaser-assisted cataract surgeries in peer-reviewed ophthalmic journals since the first procedure. In 2010, he was awarded the Waring Medal for the best publication in *Journal of Refractive Surgery*. In 2012, he received the Casebeer Award from the International Society of Refractive Surgeons (ISRS) as a recognition of his pioneer role and scientific contribution in femtolaser-assisted cataract surgery. In 2014, he received the Presidential Award of the International Society of Refractive Surgeons. He is an invited speaker in many European and international congresses. He is a Board member of the Executive Board of the