APRIL 2017 # 08

the Ophthalmologist

the Ophthalmologist *Power List* 2017

Meet the Top 50 "Rising Stars" shaping the future of ophthalmology

15 – 41

BromSite™ (bromfenac ophthalmic solution) 0.075% Brief Summary

INDICATIONS AND USAGE
BromSite™ (bromfenac ophthalmic solution) 0.075% is a nonsteroidal anti-inflammatory drug (NSAID) indicated for the treatment of postoperative inflammation and prevention of ocular pain in patients undergoing cataract surgery.

DOSAGE AND ADMINISTRATION
Recommended Dosing
One drop of BromSite should be applied to the affected eye twice daily (morning and evening) 1 day prior to surgery, the day of surgery, and 14 days postsurgery.

Use with Other Topical Ophthalmic Medications
BromSite should be administered at least 5 minutes after instillation of other topical medications.

Dosage Forms and Strengths
Topical ophthalmic solution: bromfenac 0.075%.

CONTRAINDICATIONS
None

WARNINGS AND PRECAUTIONS
Slow or Delayed Healing
All topical nonsteroidal anti-inflammatory drugs (NSAIDs), including BromSite (bromfenac ophthalmic solution) 0.075%, may slow or delay healing. Topical corticosteroids are also known to slow or delay healing. Concomitant use of topical NSAIDs and topical steroids may increase the potential for healing problems.

Potential for Cross-Sensitivity
There is the potential for cross-sensitivity to acetylsalicylic acid, phenylacetic acid derivatives, and other NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%. Therefore, caution should be used when treating individuals who have previously exhibited sensitivities to these drugs.

Increased Bleeding Time of Ocular Tissue
With some NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%, there exists the potential for increased bleeding time due to interference with platelet aggregation. There have been reports that ocularly applied NSAIDs may cause increased bleeding of ocular tissues (including hyphemas) in conjunction with ocular surgery.

It is recommended that BromSite be used with caution in patients with known bleeding tendencies or who are receiving other medications which may prolong bleeding time.

Keratitis and Corneal Reactions
Use of topical NSAIDs may result in keratitis. In some susceptible patients, continued use of topical NSAIDs may result in epithelial breakdown, corneal thinning, corneal erosion, corneal ulceration or corneal perforation. These events may be sight threatening. Patients with evidence of corneal epithelial breakdown should immediately discontinue use of topical NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%, and should be closely monitored for corneal health.

Post-marketing experience with topical NSAIDs suggests that patients with complicated ocular surgeries, corneal denervation, corneal epithelial defects, diabetes mellitus, ocular surface diseases (e.g., dry eye syndrome), rheumatoid arthritis, or repeat ocular surgeries within a short period of time may be at increased risk for corneal adverse events which may become sight threatening. Topical NSAIDs should be used with caution in these patients.

Post-marketing experience with topical NSAIDs also suggests that use more than 24 hours prior to surgery or use beyond 14 days postsurgery may increase patient risk for the occurrence and severity of corneal adverse events.

Contact Lens Wear
BromSite should not be administered while wearing contact lenses. The preservative in BromSite, benzalkonium chloride, may be absorbed by soft contact lenses.

ADVERSE REACTIONS
Clinical Trial Experience
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

The most commonly reported adverse reactions in 1–8% of patients were: anterior chamber inflammation, headache, vitreous floaters, iritis, eye pain and ocular hypertension.

USE IN SPECIFIC POPULATIONS
Pregnancy

Risk Summary
There are no adequate and well-controlled studies in pregnant women to inform any drug associated risks. Treatment of pregnant rats and rabbits with oral bromfenac did not produce teratogenic effects at clinically relevant doses.

Clinical Considerations
Because of the known effects of prostaglandin biosynthesis-inhibiting drugs on the fetal cardiovascular system (closure of ductus arteriosus), the use of BromSite during late pregnancy should be avoided.

Data
Animal Data
Treatment of rats with bromfenac at oral doses up to 0.9 mg/kg/day (195 times a unilateral daily human ophthalmic dose on a mg/m^2 basis, assuming 100% absorbed) and rabbits at oral doses up to 7.5 mg/kg/day (3243 times a unilateral daily dose on a mg/m^2 basis) produced no structural teratogenicity in reproduction studies. However, embryo-fetal lethality, neonatal mortality and reduced postnatal growth were produced in rats at 0.9 mg/kg/day, and embryo-fetal lethality was produced in rabbits at 7.5 mg/kg/day. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Lactation
There are no data on the presence of bromfenac in human milk, the effects on the breastfed infant, or the effects on milk production; however, systemic exposure to bromfenac from ocular administration is low. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for bromfenac and any potential adverse effects on the breast-fed child from bromfenac or from the underlying maternal condition.

Pediatric Use
Safety and efficacy in pediatric patients below the age of 18 years have not been established.

Geriatric Use
There is no evidence that the efficacy or safety profiles for BromSite differ in patients 65 years of age and older compared to younger adult patients.

NONCLINICAL TOXICOLOGY
Carcinogenesis, Mutagenesis and Impairment of Fertility
Long-term carcinogenicity studies in rats and mice given oral doses of bromfenac up to 0.6 mg/kg/day (129 times a unilateral daily dose assuming 100% absorbed, on a mg/m^2 basis) and 5 mg/kg/day (540 times a unilateral daily dose on a mg/m^2 basis), respectively revealed no significant increases in tumor incidence.

Bromfenac did not show mutagenic potential in various mutagenicity studies, including the bacterial reverse mutation, chromosomal aberration, and micronucleus tests.

Bromfenac did not impair fertility when administered orally to male and female rats at doses up to 0.9 mg/kg/day and 0.3 mg/kg/day, respectively (195 and 65 times a unilateral daily dose, respectively, on a mg/m^2 basis).

PATIENT COUNSELING INFORMATION
Slow or Delayed Healing
Advise patients of the possibility that slow or delayed healing may occur while using NSAIDs.

Concomitant Topical Ocular Therapy
If more than one topical ophthalmic medication is being used, advise patients to administer BromSite at least 5 minutes after instillation of other topical medications.

Concomitant Use of Contact Lenses
Advise patients not to wear contact lenses during administration of BromSite. The preservative in this product, benzalkonium chloride, may be absorbed by soft contact lenses.

Sterility of Dropper Tip/Product Use
Advise patients to replace the bottle cap after use and do not touch the dropper tip to any surface as this may contaminate the contents.

Advise patients to thoroughly wash hands prior to using BromSite.

Rx Only
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Indications and Usage

BromSite™ (bromfenac ophthalmic solution) 0.075% is a nonsteroidal anti-inflammatory drug (NSAID) indicated for the treatment of postoperative inflammation and prevention of ocular pain in patients undergoing cataract surgery.

Important Safety Information

- **Slow or Delayed Healing:** All topical nonsteroidal anti-inflammatory drugs (NSAIDs), including BromSite (bromfenac ophthalmic solution) 0.075%, may slow or delay healing. Topical corticosteroids are also known to slow or delay healing. Concomitant use of topical NSAIDs and topical steroids may increase the potential for healing problems.
- **Potential for Cross-Sensitivity:** There is the potential for cross-sensitivity to acetylsalicylic acid, phenylacetic acid derivatives, and other NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%. Therefore, caution should be used when treating individuals who have previously exhibited sensitivities to these drugs.
- **Increased Bleeding Time of Ocular Tissue:** With some NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%, there exists the potential for increased bleeding time due to interference with platelet aggregation. There have been reports that ocularly applied NSAIDs may cause increased bleeding of ocular tissues (including hyphemas) in conjunction with ocular surgery.

  It is recommended that BromSite be used with caution in patients with known bleeding tendencies or who are receiving other medications which may prolong bleeding time.
- Use of topical NSAIDs may result in keratitis. Patients with evidence of corneal epithelial breakdown should immediately discontinue use of topical NSAIDs, including BromSite (bromfenac ophthalmic solution) 0.075%, and should be closely monitored for corneal health. Patients with complicated ocular surgeries, corneal denervation, corneal epithelial defects, diabetes mellitus, ocular surface diseases (e.g., dry eye syndrome), rheumatoid arthritis, or repeat ocular surgeries within a short period of time may be at increased risk for corneal adverse events which may become sight threatening. Topical NSAIDs should be used with caution in these patients. Post-marketing experience with topical NSAIDs also suggests that use more than 24 hours prior to surgery or use beyond 14 days postsurgery may increase patient risk for the occurrence and severity of corneal adverse events.
- BromSite should not be administered while wearing contact lenses. The preservative in BromSite, benzalkonium chloride, may be absorbed by soft contact lenses.
- The most commonly reported adverse reactions in 1% to 8% of patients were anterior chamber inflammation, headache, vitreous floaters, iritis, eye pain, and ocular hypertension.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call 1-800-FDA-1088.

Please see brief summary of full Prescribing Information on the adjacent page.

NSAID=nonsteroidal anti-inflammatory drug.

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On The Cover

The Power List gets a Mondrian Makeover

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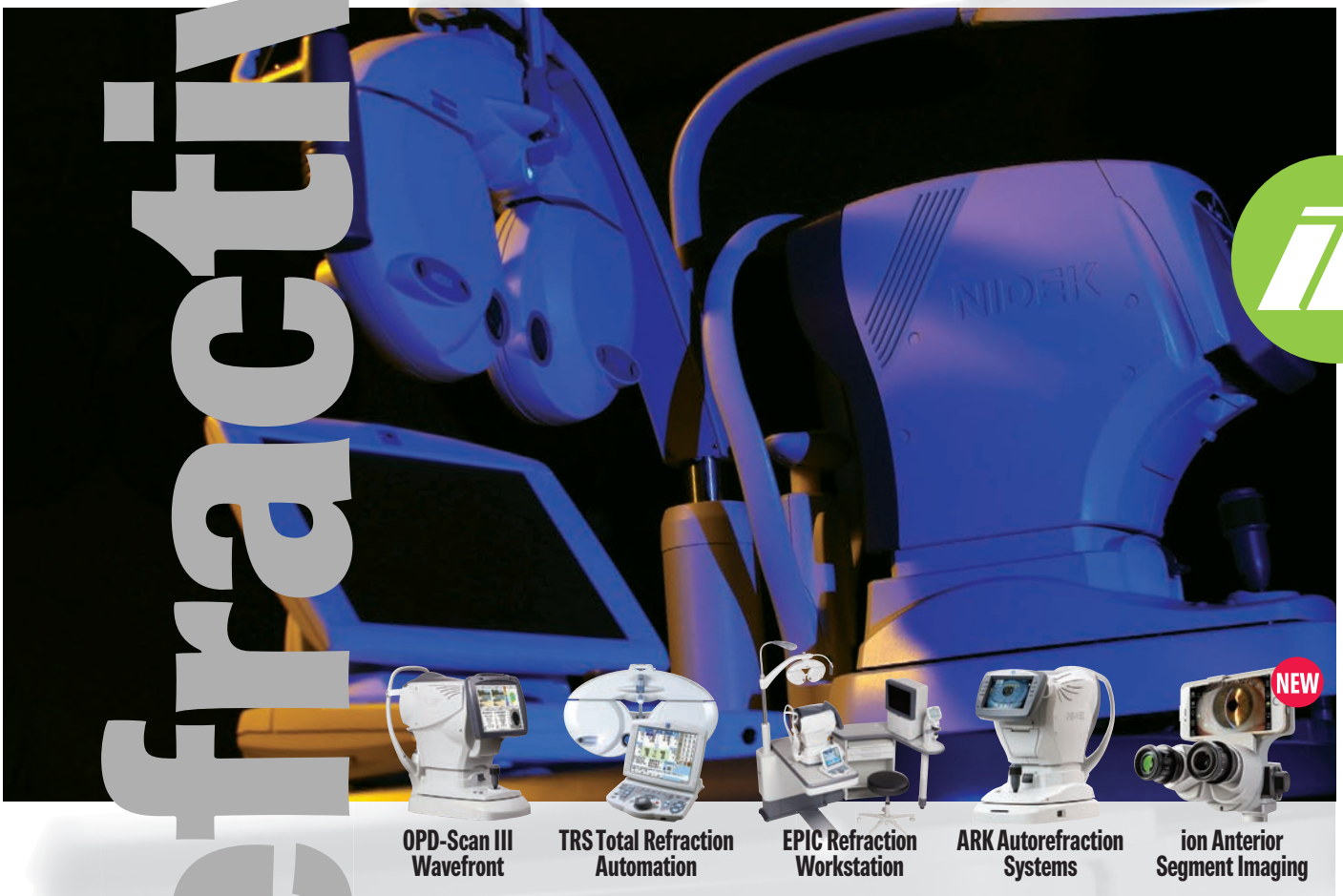

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From Peer to Peer

The Power List is gloriously subjective. Why? Because it's ophthalmologists who do the voting!

How do you define a rising star in ophthalmology? It's not easy. Two years ago, we used the cut-off of 40 years and under. The quality of our cadre was the highest – but had we made the age limit too low? Was it fair on people who really were only just establishing themselves in their own right as an ophthalmologist of renown, after years of training? I had to draw the line somewhere – but was it in the right place? This year, we've drawn the line in a different place (page 15) – and it's no longer the "Top 40 Under 40." We've changed the name to better reflect our initial intention: "Rising Stars."

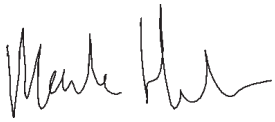
I know some of you dislike "Top Doctor" lists – Harry Quigley says as much in his In My View article in last month's issue (1). But this is no such thing. It is not a public popularity contest. I view the Power Lists as an opportunity for peers to let other peers know that they respect them and their work. And though it's true that the list is subjective – isn't that the glorious part, given that the people voting are almost entirely ophthalmologists?

I do recognize that such lists rarely recognize the people on the front line, working way beyond their contracted hours to clear a clinic or complete that day's list. But this magazine is your magazine. If that's the situation you face, day in and day out, talk to us. These issues need to be raised, and if you work with us to tell those stories, they'll get a good airing.

The Power Lists are all about celebrating effort and achievement. I'm very fortunate as Editor of The Ophthalmologist to be able to talk to the big names featured, and when I ask them how they got to where they are, nine times out of 10, they tell me, "I was in the right place at the right time." But let's not be under any illusions: they've worked incredibly hard to get there too. That deserves an immense amount of respect. Kudos to them.

Of course, many of the rising stars of today will become the leading lights of the future. And the future of eyecare is one where aging baby boomers are presenting en masse with age-related eye disease – many clinics are already full to bursting point. But I see the research that these rising stars are performing – and it looks like much of it should be game-changing. So we're celebrating these ophthalmologists' achievements today, but if their work pays off, I really hope we're going to be celebrating them with far more gusto in a decade or so.

Mark Hillen
Editor



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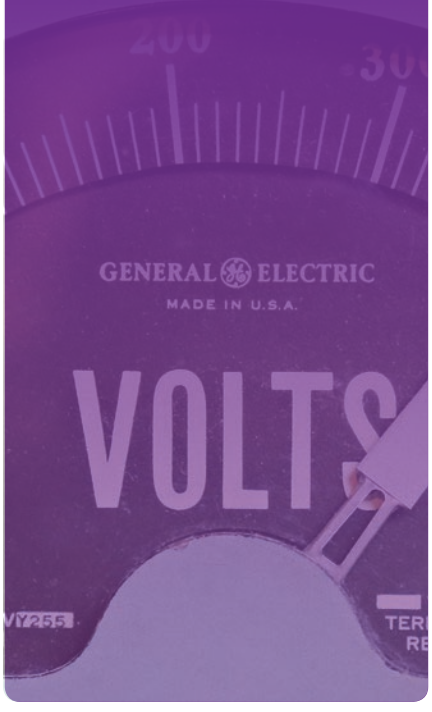
Upfront

Reporting on the innovations in medicine and surgery, the research policies and personalities that shape the practice of ophthalmology.

We welcome suggestions on anything that's impactful on ophthalmology; please email edit@theophthalmologist.com



Retinal Prostheses: The Next Generation

Two approaches that could result in a better retinal implant

Fusing the latest technology with human biology to bring sight to the blind, retinal prostheses capture the imagination. And though multiple devices are now on the market, they're still not perfect. Complicated to make and challenging to implant, some require an external camera to function. Most require trans-ocular cables for power or data transfer (which risk damaging the soft tissue of the retina every time the eye moves) and there have been concerns about the longevity of such electrical components placed in distinctly wet biological tissues. Finally, patients achieve visual acuities of less than 20/200, so they are still legally blind. Can things be improved?

Maya-Vetencourt et al. (1) report the development of a fully organic retinal prosthesis that might fit the bill. Metal and silicon-free, it's composed of a passive, silk fibroin substrate, a central conductive layer of poly (3,4-ethylene-dioxythiopene)-poly(styrenesulfonate) – PEDOT:PSS for short, and a superficial semiconductive layer of poly(3-hexylthiophene) – P3HT. In the past (2), it's been shown that glass slides coated with P3HT can photoactivate neurons grown on the slide, and when implanted into rats with light-induced photoreceptor degeneration, it can restore light sensitivity – all without requiring a power supply or any external components. This flexible silk-based iteration gets rid of the glass – and possibly the soft tissue damage and degradation issues of current retinal prosthesis designs. They turned to Royal College of Surgeons (RCS) rats, a widely recognized model of retinitis pigmentosa, to test the design – and their experimental approach and assessments are depicted in Figure 1.

At 30 days post implantation (DPI), they found that, at illuminances of ≥4 lux, their prosthesis rescued the pupillary reflex, and that prosthesis-induced visually evoked potentials (VEPs) could be detected in the primary visual (V1) cortex in a manner that topographically represented the light-dependent activation of the inner

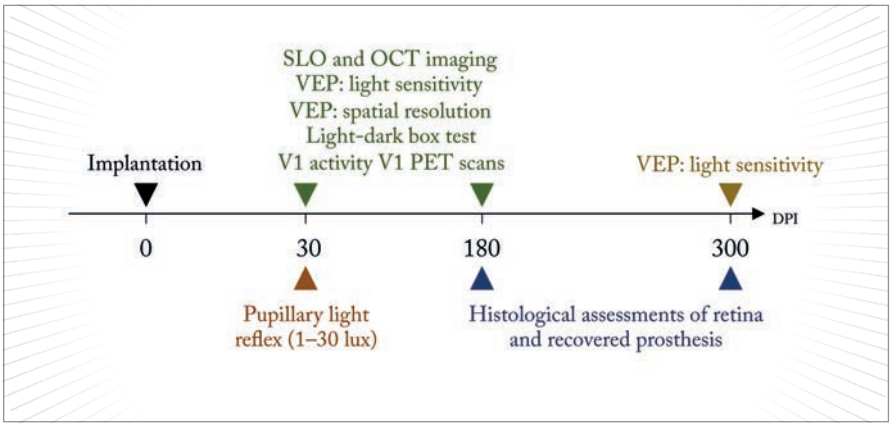


Figure 1. The assessments performed by Maya-Vetencourt et al (1) to assess the function of a fully organic retinal prosthesis implanted in RCS rats. DPI, days post implantation; OCT, optical coherence tomography; PET, positron emission tomography; RCS, Royal College of Surgeons; SLO, scanning laser ophthalmoscopy; VEP, visual evoked potential.

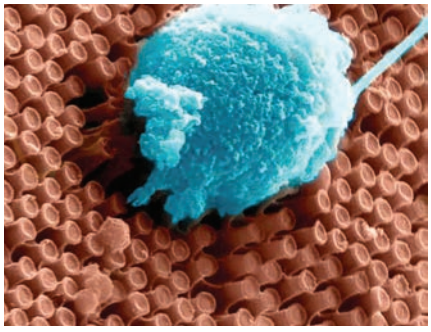


Figure 2. Primary cortical neurons cultured on the surface of an optoelectronic nanowire array.

retina circuitry harboring the prosthesis. A number of light stimulation paradigms paired with V1 VEP measurements were performed to assess the recovery of visual cortical response and spatial resolution, and visually-driven behavior was assessed using the light-dark box test. The organic retinal prosthesis performed significantly better than sham- and non-implanted RCS rat controls – and the prosthesis-dependent recovery of visual function persisted up to 6–10 months after surgery (when the rats were sacrificed for histological analysis). Further, positron emission tomography neuroimaging showed that the prosthesis' rescue of visual function was associated with increased basal activity in V1 cortex. Clearly it's working, but the question is how? The authors don't actually know: "the detailed principle of operation of the prosthesis remains uncertain."

Meanwhile, engineers at the University of California San Diego and the La Jolla-based startup, Nanovision Biosciences Inc. have taken a different approach: optoelectronic silicon nanowires (Figure 2) that can both sense light and stimulate the retina (3). They're powered by a wireless inductive system that transfers energy with up to 90 percent efficiency, and also allows both data transfer and control over stimulation paradigms. One of the engineers involved in the project, Gert Cauwenberghs, noted, "To restore functional vision, it is critical that the neural interface matches the resolution and sensitivity of the human retina." They might be on the right track – the tiny size of the nanowires more closely match the dense spacing of photoreceptors in the human retina than the 60 and 1500 electrodes present in the Second Sight Argus II and Retina Implant Alpha IMP prostheses, respectively. But can it work?

To provide proof of concept, the researchers performed in vitro electrophysiological experiments on the retinae from rhodopsin P23H knock-in rats (a model of retinitis pigmentosa-like retinal degeneration). And they were encouraged by what they found: the horizontal and bipolar neurons in the retina fired action potentials preferentially when the prosthesis was exposed to a combination of light and electrical potential – and were silent when either light or electrical bias was absent. In other words, they showed that the nanowire array successfully responds to light and electrical stimulation. Animal tests with the device are in progress, with clinical trials set to follow. *MH*

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Business in Brief

Allergan and Editas join forces, Carl Zeiss win a patent infringement case, and more…

- Pharmaceutical giant Allergan has entered into an R&D agreement with new kid on the block and CRISPR specialist Editas Medicine to discover and develop therapies based on genome-editing for ocular diseases. Editas will receive $90 million upfront while Allergan will be able to license up to five candidate programs targeting eye disease. The first could be a lead candidate for Leber Congenital Amaurosis (LCA10) that is currently in the preclinical stage but predicted to enter the clinic later this year.
- Carl Zeiss Meditec has won a patent infringement suit concerning its aphakic trifocal lens. A court in Dusseldorf ruled that a lens produced by VSY Biotechnology BV and Fritz Ruck Ophthalmologische Systeme GmbH infringed upon the patent held by Zeiss, and ordered that all of VSY's trifocal lenses be recalled and destroyed.
- Bill Ackman has announced that Pershing Square Capital Management has sold all shares in Valeant, and says that he is "deeply and profoundly" sorry for his investment in Valeant, writing in a letter "Clearly, our investment in Valeant was a huge mistake. We deeply regret this mistake, which has cost all of us a tremendous amount, and which has damaged the record of success of our firm."
- Meanwhile, Valeant's former CEO, Michael Pearson, is suing the company, claiming that it failed to pay him three million shares as part of his exit package.

A Serious Breach of Trust

How did people react to the news that an unapproved stem cell therapy blinded three patients?

The recent news that three female patients suffered vision loss after receiving an unproven stem cell therapy for AMD has shocked clinicians, scientists and the public alike.

Published in the New England Journal of Medicine, the report described a range of complications suffered by the women (including vitreous hemorrhages and retinal detachments) after they'd received bilateral intravitreal injections of autologous stem cells prepared from adipose tissue (1). A year later, one patient was totally blind, and the other two were left with vision ranging from 20/200 to light perception. So what happened? The authors suggest that contamination of the injected material, and/or proliferation of the "stem cells" into myofibroblasts might have been responsible.

The events have opened a regulatory 'can of worms,' raising concerns about the oversight and regulation of innovative therapies. The report brought three disturbing points to light:

i) the study was listed on ClinicalTrials.gov (NCT02024269)
ii) at least one of the patients believed they were participating in a clinical trial for AMD
iii) the women each paid $5,000 to receive the experimental treatment.

Here, we take a look at some of the reactions…

Jeffrey Goldberg, ophthalmologist at Stanford University, Palo Alto, California (2):

"There is a lot of very well-founded evidence for the positive potential of stem [cell] therapy for many human diseases, but there's no excuse for not designing a trial properly and basing it on preclinical research."

Thomas Albini, ophthalmologist at Bascom Palmer Eye Institute, Miami, Florida (2, 3):

"In this case, these women participated in a clinical enterprise that was off-the-charts dangerous [...] I knew that things like this could happen in other countries that don't have a sophisticated medical regulatory environment. But I really was naïve to the fact that this could happen in the United States. Then I realized I was just as naïve about it as the patients were."

George Daley, leading stem cell biologist and Dean of Harvard Medical School, Boston, Massachusetts (4):

Daley wrote that there was a "stark distinction between innovative treatments that are founded on methodical preclinical evidence" and "the unproven interventions that are offered by practitioners who are naïve regarding the biological complexities of stem cells or by charlatans peddling the modern day equivalent of snake oil." He added that it represents a "gross violation of professional and possibly legal standards."

Stephen Rose, Chief Research Officer at Foundation Fighting Blindness, Columbia, Maryland (5):

"What's important for the public to know is that the [ClinicalTrials.gov]website listing does not mean that the procedure is approved by NIH and has undergone FDA review and authorization […] Unfortunately, there are many unregulated 'trials' that are taking advantage of the desperation associated with loss of vision, and peoples' vision and lives are at risk."

Peter Aldhous, BuzzFeed News Reporter (6):

"Inquiries by BuzzFeed News reveal that the original ethical approval raised troubling questions from the start […] The ICMS ethical board that approved the trial included one doctor whose medical license had been placed on probation for failing to meet the 'applicable standard of care' in his own medical practice, plus another who had earlier been convicted of violating federal law by breaching a patient's medical privacy."

Michael Tomás, CEO of U.S Stem Cell (the company affiliated with the clinic) (3):

In a responding statement to the Miami Herald, Tomás wrote "For nearly 20 years our clinics have conducted more than 7,000 stem cell procedures with less than 0.01 percent adverse reactions reported." According to the article, he declined to comment on the patients involved, but confirmed that the clinic was no longer offering eye treatments. *RS*

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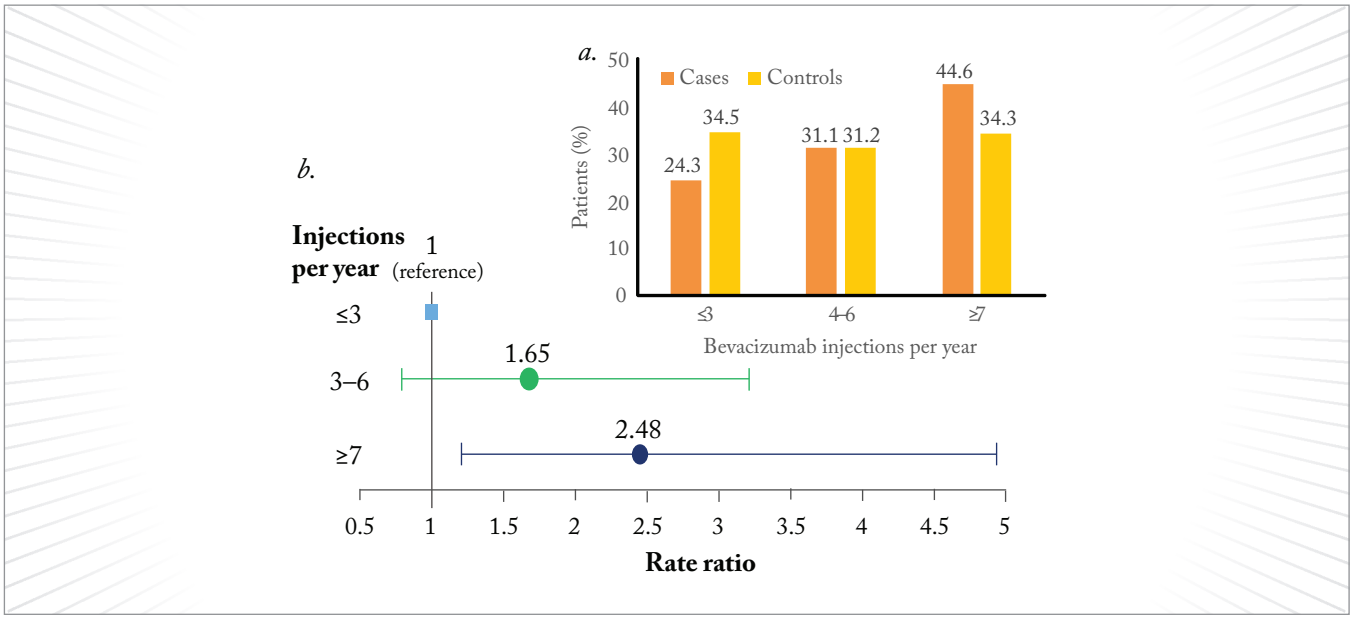

Figure 1. a. Number of number of intravitreous bevacizumab injections per year; b. Adjusted rate ratios for glaucoma surgery stratified by the number of bevacizumab injections received per year. All data were normalized to the ≤3 injections per year group.

When Multiple Punctures Don't Deflate

Repeated bevacizumab injections increase the risk of glaucoma surgery

It's now acknowledged that intravitreal injections of anti-VEGF agents do carry a small risk of increasing patients' IOP – sometimes transiently, sometimes sustained. Many patients receive these injections monthly, so the question is: how serious can it get? To find out, a team of Vancouver-based ophthalmologists and researchers got on the case (1).

The team had access to large, linked, population-based heath databases (supported by the British Columbia Ministry of Health) and searched for all patients with ophthalmic issues that had received intravitreous bevacizumab for exudative AMD during the years of 2009–2013. Next, they identified a subset of interesting records – ones that contained glaucoma surgical codes for trabeculectomy, complicated trabeculectomy, glaucoma drainage devices, and cycloablative procedures (n=74). Ten controls were identified for each of the 74 cases and matched for age, prexisting conditions, calendar time, and follow-up time for each case (n=740). Both cases and controls were stratified by the number of bevacizumab injections received per year: ≤3, 4–6, and ≥7.

After adjusting for comorbidities, the proportion of patients who received ≥7 injections per year was 10.3 percent greater than the proportion in the control group (44.6 vs. 34.3 percent; Figure 1a). For the case-control analysis, patients who received three or fewer injections per year served as the reference category; here, the adjusted rate ratio (RR) of glaucoma surgery among those who received seven or more injections per year was 2.48 (95% CI, 1.25–4.93), with the RR for patients receiving 3–6 injections per year being 1.65 (0.84–3.23; Figure 1b).

In an accompanying editorial, Apte et al. (2) noted, "most patients who receive intravitreous anti-VEGF injections do not develop ocular hypertension or glaucoma." However, the authors also stated that it was "prudent to observe all patients receiving intravitreous anti-VEGF injections for evidence of elevated IOP and glaucoma" and that such observation was "especially important for those patients with preexisting ocular hypertension or glaucoma." *MH*

References

1. *BD Eadie et al., "Association of repeated intravitreous bevacizumab injections with risk for glaucoma surgery", JAMA Ophthalmology, [Epub ahead of print] (2016). PMID: 28301639.*
2. *RS Apte et al., "Anti-VEGF injections and glaucoma surgery", JAMA Ophthalmology, [Epub ahead of print] (2016). PMID: 28301640.*

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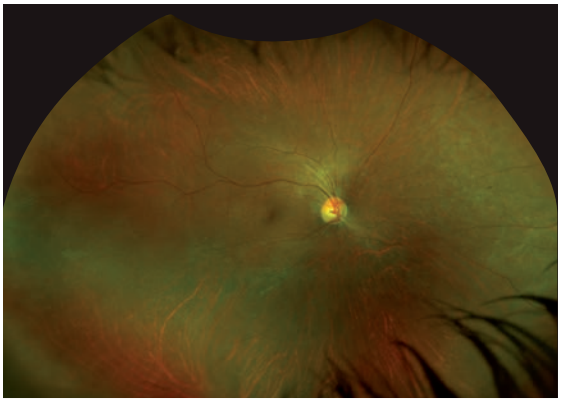
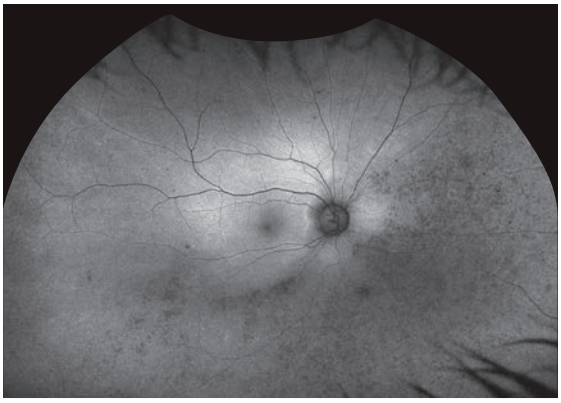
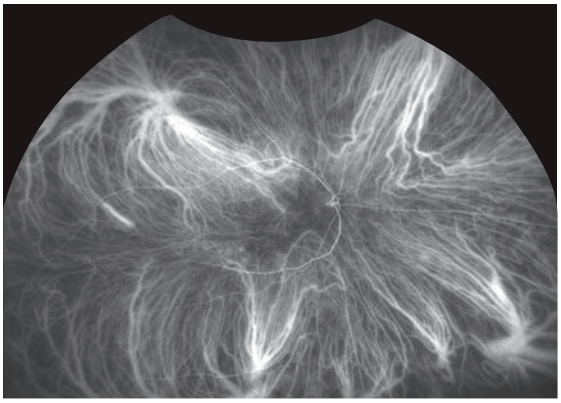


optomap ***plus*** Courtesy of SriniVas Sadda, MD



optomap ***af*** Courtesy of SriniVas Sadda, MD

optomap ***fa*** Courtesy of Paulo Stanga, MD



optomap ***icg*** Courtesy of SriniVas Sadda, MD

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Sunday, May 7

Starting with Visual Electrophysiology: A New User's Experience

Speaker: William Ayliffe, MD • Time: 3:00PM - 4:00PM • Booth 813

Monday, May 8

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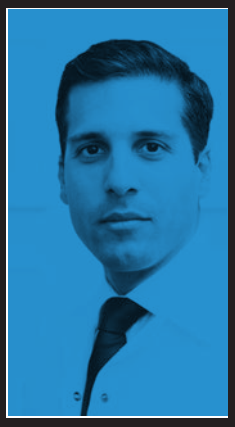
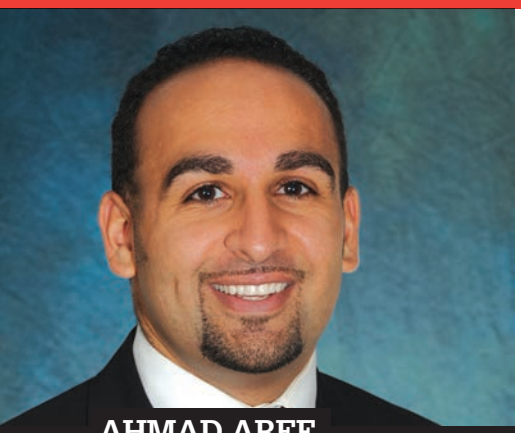
the Ophthalmologist Power List 2017



Thanks to the demographics of the developed world, the future of eyecare looks like it will be one of limited resources and rising patient burden. So who will lead ophthalmology over the next few decades and shape its future? To find out, we asked you, our readers, to vote for ophthalmology's Top 50 rising stars… and here they are.

Welcome to the 2017 Power List.



AHMAD AREF

ASSISTANT PROFESSOR OF OPHTHALMOLOGY AT THE UNIVERSITY OF ILLINOIS AT CHICAGO (UIC), IL, USA

As well as being Assistant Professor of Ophthalmology at UIC, Aref directs their Residency Training Program. He is also an attending physician at the Glaucoma and Cataract Consultation Service at the Illinois Eye & Ear Infirmary. Aref is interested in the development of novel glaucoma surgical techniques, the management of dry eye and ocular surface disease related to glaucoma medication toxicity, and the improvement of glaucoma diagnosis using computerized imaging methods. He has authored over 40 scientific publications and book chapters and serves as an active peer-reviewer for several ophthalmic medical journals. He has also published a textbook, "Advanced Glaucoma Surgery." Aref maximizes his time outdoors during the short Chicago summers by jogging, swimming and cycling along the Lake Michigan bike path.

A nominator said: "Aref has taken on several leadership roles in ophthalmology and has written several high-impact papers as well as a textbook, and given several important lectures at national and international meetings. In 2018, Aref will be completing an MBA in economics and strategic management from the University of Chicago Booth School of Business."

ALAIN SAAD

ANTERIOR SEGMENT AND REFRACTIVE SURGERY DEPARTMENT, ROTHSCHILD FOUNDATION, PARIS, FRANCE

A gifted corneal surgeon, Saad, along with his colleague Damien Gatinel, developed an artificial intelligence (AI) system for the detection of corneal ectasia-susceptible eyes: the SCORE analyzer. A reviewer and editor for several ophthalmology journals, he has over 40 publications to his name. His research interests include corneal ectasias, corneal topography and tomography, wavefront biomechanics and new keratoplasty techniques.

One nominator said: "For his young age Saad is not only a great surgeon, already teaching younger colleagues in anterior segment surgery, but is also publishing a lot as well as thinking forward and inventing new products to make our life easier. His mentality, hard work, and humanity should be an example for all of us. Definitely a top ophthalmologist, if not already now, then a few years down the road."

AMIR KASHANI

ASSISTANT PROFESSOR OF CLINICAL OPHTHALMOLOGY AND DIRECTOR OF THE OCULAR IMAGING CENTER AT USC ROSKI EYE INSTITUTE, LOS ANGELES, CA, USA

A clinician-scientist developing novel diagnostic and therapeutic methods to treat retinal diseases, Kashani is the principal investigator for a number of ongoing trials of stem cell therapies for the treatment of AMD. He's also investigating the use of advanced imaging spectroscopy and OCT methods to improve the diagnosis and treatment of retinal diseases, and recently co-authored a book entitled 'Optical Coherence Tomography and OCT Angiography: Clinical Reference and Case Studies.'

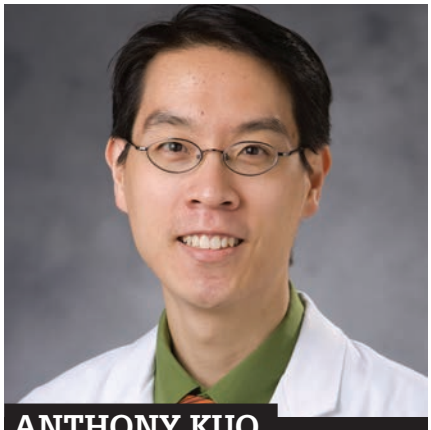
An advocate for continued NIH funding for research into blinding eye diseases, he testified in front of the U.S. Congress in 2016 to highlight International Age-Related Macular Degeneration Awareness Week and to argue for continued NIH funding support. Kashani and his wife recently had their third child – and with three children under five, his aim is to spend time with his family when not in the clinic or the lab.

ANDREA TOOLEY

OPHTHALMOLOGY RESIDENT AT MAYO CLINIC, ROCHESTER, MN, USA

With an active online and social media presence, Tooley is quickly establishing herself as a leading voice for young ophthalmologists. She is highly interested in philanthropic ophthalmology, and increasing medical students' interest in ophthalmology and medicine.

One nominator said: "Andrea Tooley is without a doubt a rising star in ophthalmology. As a resident, she has already demonstrated her dedication to education and leadership. Andrea was initially introduced to ophthalmology while flying airplanes in training for her private pilot's license. Another pilot introduced Andrea to Orbis International, and she subsequently accompanied the organization on a trip to Peru in 2006. Since that time, Andrea has continued to be involved in philanthropic ophthalmology, starting a free eye clinic in Indianapolis while she was in medical school. Outside of her clinical responsibilities, Andrea maintains a tremendous online presence through her blog, Instagram, and YouTube channels. She reaches over 30,000 subscribers on Instagram, and her YouTube channel has over 50,000 subscribers and 3 million views."



ANTHONY KUO

ASSISTANT PROFESSOR OF OPHTHALMOLOGY AND BIOMEDICAL ENGINEERING, DUKE UNIVERSITY SCHOOL OF MEDICINE, DURHAM, NC, USA

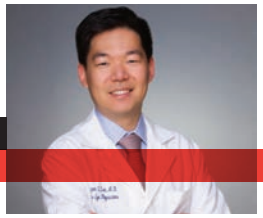
Kuo is an Assistant Professor of Ophthalmology and Biomedical Engineering at Duke University. He is a clinician-scientist with an active clinical practice in cornea and refractive surgery and an active laboratory program developing and translating OCT technologies for ophthalmic use. Specifically, he and his team are developing OCT methods to unify and digitally scan the whole eye. With collaborators at Duke, he is also involved in the development and translation of intra-surgical OCT technologies including 4D intra-surgical OCT (live 3D volumes across time). His research is supported by grants awarded by the National Institutes of Health, the Wallace H. Coulter Foundation, and the Department of Defense. He has also been awarded an Alcon Research Institute Young Investigator Award, the Dastgheib Pioneer Award in Ocular Innovation, and the Duke Health Scholar Award.

A nominator said: "We have a lot of stars in the field of ophthalmology at Duke but one of the fastest rising stars is Kuo. His work that is making intraoperative real-time 4D-OCT mainstream is truly remarkable. DSAEK, DMEK, and PDEK procedures in patients considered complex with poor visibility would be impossible without this technology that Kuo is developing and advancing."

ARSHAM SHEYBANI

ASSISTANT PROFESSOR OF OPHTHALMOLOGY AND VISUAL SCIENCES AT WASHINGTON UNIVERSITY SCHOOL OF MEDICINE IN ST. LOUIS, MO, USA

Sheybani specializes in glaucoma and complex anterior segment surgery. He is actively involved in research developing devices to improve the safety of glaucoma surgery, pseudoexfoliative glaucoma, malignant glaucoma, and angle closure glaucoma. Sheybani is an avid surgical teacher of residents and fellows, and he lectures nationally and internationally on novel glaucoma surgeries and complex surgical cases. Growing up in Louisiana has left him with a permanent love for crawfish, so he flies live crawfish to St. Louis for a yearly boil for friends and family.



BRYAN LEE

OPHTHALMOLOGIST, ALTOS EYE PHYSICIANS, LOS ALTOS, CA, USA

Not only a specialist in cataract, cornea, and refractive surgery, Lee also has a JD from Harvard Law School and regularly publishes on medicolegal issues in ophthalmology. His research interests include transparency in the doctor-patient relationship, the effect of electronic medical records, and cataract surgery outcomes. He currently is Secretary of the Vanguard Ophthalmology Society and an ASCRS representative on the AAO Council. He also serves on the ASCRS Young Eye Surgeons Clinical Committee, Phaco Fundamentals Editorial Board, and the AAO's Online Education Committee, ONE Refractive Management Committee, and Refractive Surgery Basic and Clinical Science Course Committee. A regular presence on top doctor lists, Lee has also received the Maxwell Grand Prize in Ophthalmology, the Latham Vision Research Innovation Award, and Vanguard Ophthalmology Society Scholar Award.

A nominator said: "Lee is a brilliant ophthalmologist who proves that deep learning in the best institutions can be translated into meaningful clinical work that can change the world. His academic achievements speak for themselves. Since completing his training he has dedicated himself to applying his knowledge and skills to the betterment of his patients and colleagues. He has authored innumerable articles, book chapters and the like, and has been a frequent lecturer at all the important meetings. Besides all of this, Bryan probably has the driest sense of humor of any individual I have ever met, which proves he is possibly superhuman."

CAMIEL BOON

CONSULTANT OPHTHALMOLOGIST AND RETINA SPECIALIST, LEIDEN UNIVERSITY MEDICAL CENTRE, THE NETHERLANDS

As well as having active research interests, Boon was appointed as Professor of Clinical Ophthalmogenetics at the University of Amsterdam in November 2016 – at only 37 years of age. Boon is a fellow of the European Board of Ophthalmology, a board member of the Medical Retina working group of the Dutch ophthalmology society, NOG, co-founder and board member of the European Young Retinal Specialists Society and founder of the international CHASE Consortium for clinical and genetic research on central serous chorioretinopathy. Boon is also the initiator and principal researcher of multiple treatment trials for diseases of the retina.

DAN LINDFIELD

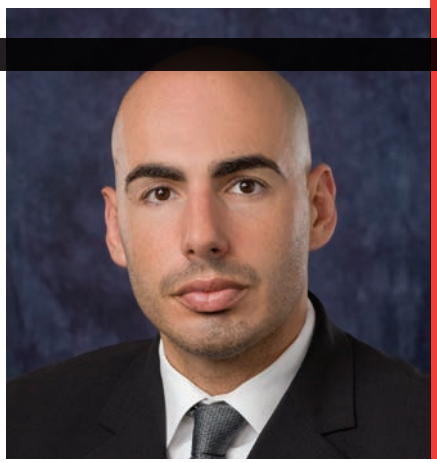
CONSULTANT OPHTHALMOLOGIST AND GLAUCOMA LEAD, ROYAL SURREY COUNTY HOSPITAL, GUILDFORD, UK

Already a prominent glaucoma surgeon, Lindfield's main interests are complex cataract surgery, all aspects of glaucoma surgery and educational research. He is a glaucoma surgical trainer, hosting registrars and consultants from England in addition to training device manufacturer employees and surgical trainers from across Europe. He has received several well-recognized national and international awards, including ESCRS Young Ophthalmologist Award, SOS First Prize, UKISCRS Best Video Award, ARVO Young Investigator Award, and has published more than 25 peer-reviewed articles in highly-regarded journals.

One of Lindfield's current research interests is the use of eye movement tracking to detect visual field changes in patients whilst they watch TV on a tablet computer. The work in collaboration with David Crabb at City University, London, plans to develop cheap, readily accessible and novel technology to aid early detection of eye disease at home.

According to one nominator, "Dan is a caring, personable ophthalmologist with a very approachable style to patient care; a strong believer in patient education and involvement. Since coming to Guildford, he has built a formidable local glaucoma service with excellent treatment and training opportunities."

DAVID ALMEIDA



VITREORETINAL SURGEON, VITREORETINAL SURGERY, PA, MINNEAPOLIS, MN, USA

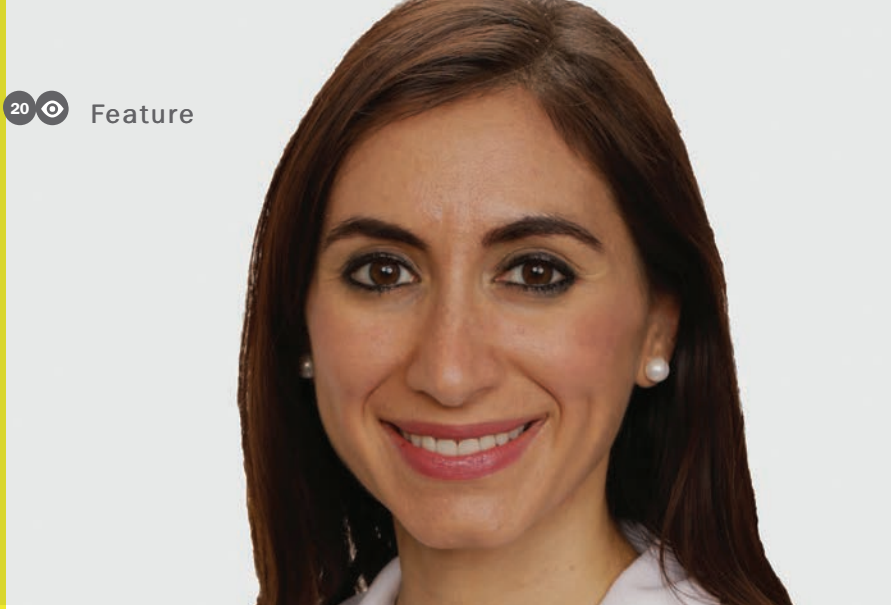
A gifted vitreoretinal surgeon, holder of a PhD in Pharmaceutical Drug Research, and co-founder of Citrus Therapeutics and author of over 100 peer-reviewed publications, Almeida's professional interests (besides ophthalmology) include business innovation and ophthalmic and biomedical research. Almeida writes a weekly blog, the Sunday Surgical Scrub, which can be found on his website davidalmeidamd.com. He is also a competitive squash player and says that in his spare time his favorite activity is spending time with his wife and three children.

A nominator said: "If I could invest in a young ophthalmologist that I anticipate will do amazing things during his career, Almeida is that type of individual. I first met him when he was in his fellowship, and I was amazed by his brilliance and his talent as a researcher. He's since launched his own website, and earlier this year he published his first book, 'Decision Diagnosis – Seven Antidotes to Decision Procrastination,' which has already made me rethink how I make clinical decisions. I believe David is a perfect fit as a rising star within ophthalmology."

DAVID SUNG YONG KANG

FOUNDER AND CLINICAL DIRECTOR AT EYEREUM OPHTHALMIC CLINIC AND CEO OF EYEREUM HEALTHCARE, THE REPUBLIC OF KOREA

Kang also serves as outpatient Clinical Associate Professor at Ulsan University, Asan Medical Center and as out-patient Assistant Clinical Professor at Severance Hospital, Yonsei University School of Medicine in Seoul. His primary passion is corneal wavefront-guided ablation for amelioration of aberrations for keratoconus, cornea ectasia, and central islands. Kang has received three Best Academic Achievement Awards from the Korean Ophthalmological Society, including the Best Video Award. To date, he has rights to six patents. His first patent, registered in 2008, involves using circumlinear capsulorhexis technology during cataract surgery. Since then he has patented new methods of de-epithelization of the cornea prior to refractive surface ablation, removing phakic IOLs, and removing lenticules during SMILE.



DUNA RAOOF

PHYSICIAN AT HARVARD EYE ASSOCIATES, LAGUNA HILLS, CA, USA

Raoof specializes in cornea, cataract and refractive surgery, and she has been granted several honors, including the nation's most prestigious ophthalmology award: The Heed Ophthalmic Foundation Fellowship. Raoof's research interests include refractive, cataract, and corneal transplant surgery, and her work has led to numerous publications in prominent peer-reviewed publications, including Ophthalmology, Cornea, and The American Journal of Ophthalmology. An invited speaker at several national and international meetings, she has also published several textbook chapters on LASIK, corneal transplant surgical techniques, and dry eye.

A nominator said: "A well-trained ophthalmologist who has written multiple papers, Raoof is a frequent speaker at meetings and an excellent surgeon."

DAVID VOLLMAN

ASSISTANT PROFESSOR OF OPHTHALMOLOGY AND VISUAL SCIENCES AT WASHINGTON UNIVERSITY SCHOOL OF MEDICINE IN ST. LOUIS, AND CHIEF OF OPHTHALMOLOGY AT THE ST. LOUIS VA HEALTH CARE SYSTEM, MO, USA

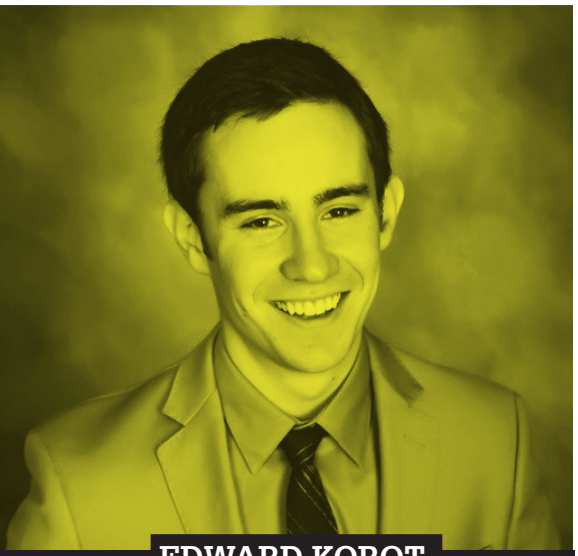
Vollman's research interests include healthcare outcomes, cost-effective delivery of healthcare, and quality improvement. He has served a site director for the Ophthalmic Surgery Outcomes Data (OSOD) research project at the St. Louis VA, which has resulted in eight peer-reviewed publications in major ophthalmic journals and 21 abstracts presented at national and international meetings. Vollman has been recognized with multiple awards for his current and prior leadership, including a VA St. Louis Medical Staff Award, an Achievement Award from the AAO, and the William Oxley Thompson Award for early career achievement from The Ohio State University Alumni Association. He is an avid Ohio State University football fan and loves to spend time and travel with his wife and son.

DAWN SIM

MEDICAL RETINA AND CATARACT CONSULTANT AT MOORFIELDS EYE HOSPITAL, LONDON, UK

Sim is a consultant ophthalmic surgeon in the medical retina service at Moorfields Eye Hospital, and a former chief resident and current clinical lead for diabetic screening there. She has a PhD from the UCL Institute of Ophthalmology for her work on endothelial progenitor cells in retinal vascular diseases and has published extensively on diabetic macular ischemia. She also has a special interest in the area of virtual clinics and teleophthalmology and is working on device-agnostic platforms to facilitate acceleration of new technology into clinical practice. An ARVO Alcon Early Career Research Award winner, Dawn is a patent holder for the use of Indocyanine Green Dye for visualization of inflammation. A prolific and successful grant-raiser, Dawn also won the Dermot Pierse prize in 2009 and the 2009 Young Investigator's Award at ARVO-Asia in 2007.

One nominator said: "Dawn is a great surgeon and a superb researcher. Her diabetic retinopathy screening work is some of the best in the world."



EDWARD KOROT

RESIDENT PHYSICIAN, DEPARTMENT OF OPHTHALMOLOGY, BEAUMONT HOSPITAL, ROYAL OAK, MI, USA

An ophthalmology resident with a keen interest in the application of novel technology to ophthalmology, Korot started medical school as a TEDMED Frontline Scholar. He's now a leading light in the application of algorithms and AI to detect signs of disease in ophthalmic images. His first publication described the creation of an algorithm that analyzes vitreous cell density in DME – and it may be the first ever objective measure of vitreous inflammation. His interest in algorithms and AI had led him to collaborate with Pearse Keane (qv) on his AI retinal image analysis work. This, combined with his prior experience with electronic health record consulting, has also led him to consult with Google Deepmind on their Streams app, which is being developed to help streamline physician alerts and task management. He's also collaborating with another Silicon Valley company, Avegant, to adapt their wearable retinal projection display for use in ophthalmic microsurgery.

EHSAN RAHIMY

SURGICAL AND MEDICAL VITREORETINAL SPECIALIST, PALO ALTO MEDICAL FOUNDATION, SAN CARLOS AND PALO ALTO, CA, USA

Rahimy has extensive experience researching medical and surgical diseases of the retina. He has over 80 peer-reviewed publications, has contributed to more than 100 abstracts presented at national and international ophthalmic meetings, and has numerous first-authored book chapters as well as other non-peer reviewed articles. His research interests include macular degeneration, diabetic retinopathy, retinal vein occlusion, novel retinal imaging platforms, and telemedicine in ophthalmology. He has a particular interest in the interplay between technology and medicine, notably with emerging AI and deep learning platforms, and how ongoing advancements and further integration will transform healthcare delivery in the future. In his spare time, he enjoys playing recreational sports and staying active outdoors in the San Francisco Bay Area.

One nominator said: "Ehsan is fresh out of fellowship but already a respected voice in the field of vitreoretinal surgery with nearly a hundred publications and book chapters as well as countless lectures and presentations to his name. His clinical acumen is unmatched for an ophthalmologist at his level of training, and colleagues often consult him on difficult and challenging cases from around the country. He reserves time for education as well, traveling the country to prepare residents for their in-service examinations. He undoubtedly will be one of the big names in retina, ophthalmology, and beyond in the years to come."

ELIZABETH YEU

ASSISTANT PROFESSOR AT, EASTERN VIRGINIA MEDICAL SCHOOL AND CORNEA, CATARACT AND REFRACTIVE SURGEON WITH VIRGINIA EYE CONSULTANTS, NORFOLK, VA, USA

Yeu is a rising leader in the fields of cornea and cataract surgery, in great demand as a speaker at national and international congresses. She cares deeply about education, and currently serves as the Chair of the Young Eye Surgeons Clinical Committee for ASCRS, as Communications Secretariat for AAO, and is the Chief Medical Editor of the peer-reviewed U.S. Ophthalmic Review.

While she is a self-proclaimed mediocre-to-poor cook in the kitchen today, Yeu supported herself through undergrad and medical school by working as a sushi chef.

A nominator said: "Elizabeth Yeu is a powerhouse when it comes to clinical, surgical and academic excellence in ophthalmology. Her productivity and value as a key opinion and thought leader in ophthalmology are only eclipsed by the quality of her surgical skills and clinical acumen. Additionally, she has already thrived in the academic setting, publishing multiple peer-reviewed articles, book chapters, and has given too many lectures to count. Having personally observed her in each of these arenas, she is definitely a member of ophthalmology's most elite class. She's also a fantastic role model for young female ophthalmologists."

ELLIOTT SOHN

ASSOCIATE PROFESSOR AND DIRECTOR OF THE SURGICAL AND MEDICAL RETINA FELLOWSHIPS AT THE UNIVERSITY OF IOWA, IA, USA

Sohn serves ARVO as Chair of the Retina (RE) section of the Annual Meeting Program Committee; the AAO as subcommittee reviewer (retina-vitreous) for the Annual Meeting Program Committee and a member of the Committee on Aging; and the American Board of Ophthalmology as an oral examiner and item writing committee member. He has written or co-authored over 45 peer-reviewed manuscripts and five book chapters, and recently served as Associate Book Editor for the AAO Basic Techniques of Ophthalmic Surgery, 3rd edition. He is on the editorial board of Scientific Reports, has been voted one of the 'Best Doctors in America' and is a member of the Macula Society, Retina Society, American Society of Retina Specialists, European Society of Retina Specialists, and Vail Vitrectomy.

Sohn is active in basic and translational research and is developing surgical tools, performing human clinical trials, and completing preclinical gene and autologous stem cell studies in pigs to treat inherited retinal degenerations. He is the PI of the NIH R01 grant 'Choroidal Disease Mechanisms in AMD.'

One nominator said: "Sohn is a vitreoretinal surgeon, young researcher and active leader with enormous potential. His recent work suggests that retinal diabetic neuropathy causes progressive damage to the nerve cells in the retina before any signs of damage to retinal blood vessels, which opens a new paradigm for the study and treatment of diabetic eye disease. Sohn is also a great clinician, educator, and an all-round nice guy."

FLORIAN KRETZ

CHIEF EXECUTIVE OFFICER & LEAD SURGEON AT EYECLINICS AHAUS-GREVEN-RAESFELD-RHEINE, GERMANY

Kretz is a cataract and refractive surgeon who also has subspecialties in glaucoma and medical retina. He is well-known as a speaker at the large international congresses, describing the results of the latest premium IOLs and patient assessment methods that best match the patient with the right IOL for them. He is also the CEO of Eyedoctors for the world ("Augenärzte für die Welt"), a non-profit NGO that supports eyecare around the globe and has recently developed and established an eye clinic in Kasana, Uganda. Their next project is a cooperation with the Cambodian NGO CISA-Khmer Sight Foundation, together with Sunil Shah and many internationally renowned ophthalmologists. The aim is to establish a center of excellence in Cambodia where the organization can treat the population for preventable blindness, and train local ophthalmologists and staff.

IRA SCHACHAR

ASSISTANT PROFESSOR OF OPHTHALMOLOGY AT STANFORD UNIVERSITY MEDICAL CENTER, STANFORD, CA, USA

After completing his residency at Kellogg Eye Center, Schachar moved to Stanford University, and is affiliated with multiple hospitals, including Stanford Hospital and Clinics and VA Palo Alto Hospital. Already working with at the cutting edge of imaging and surgical technology, Schachar's clinical and research work has already involved some of the biggest names in ophthalmology. His research interests include (but aren't limited to) AMD and retinopathy of prematurity – and he is a committed innovator in the retina space, with his name already on many ophthalmic patents.

One nominator said: "Ira Schachar is perhaps the most innovative person in the field of ophthalmology. With outside the box thinking, he has created several uniquely innovative projects leading to successful start-ups in the field of ophthalmic innovation. He is devoted to resident education.

IRINI CHATZIRALLI

ACADEMIC UNIVERSITY SCHOLAR AT NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS, GREECE

Chatziralli is an ophthalmic surgeon specializing in medical retina. She is actively involved in many research projects and has over 100 publications in peer-reviewed journals. One of her favorite hobbies is music and she has played piano for around 25 years. She says that photography is her other love outside ophthalmology.

A nominator said: "Irini is an exceptional personality. She has great research activity that is proven by her prolific publication record. She is also a very good and precise surgeon, as well as a medical retina specialist. I recommend her as a 'Rising Star' in ophthalmology without any hesitation. She is a voracious researcher and an asset in each clinic! Her clinical and research experience is outstanding given her young age."

JENNIFER LOH

PHYSICIAN AT LOH OPHTHALMOLOGY ASSOCIATES, MIAMI, AND BOARD MEMBER OF EYE PHYSICIANS OF FLORIDA, USA

A founder and executive board member of the Refractive Surgery Alliance (RSA), and a founder of the ASPENS group of female leading ophthalmologists (which merged with the CEDARS group in 2015), Loh is a hard-working comprehensive ophthalmologist who has a particular focus on refractive and femtosecond laser-assisted cataract surgery. As a medical student, she was inducted into the Indiana University chapter of the Gold Humanism Honor Society and was also fortunate to serve as chief resident for both her intern year and ophthalmology residency class, and today Loh participates on the faculty of many conferences. In 2016, she received the RSA's President's Award. Away from the clinic, Loh is learning to ski – blue runs are now being conquered; black runs are next!

One nominator said: "Jennifer Loh is a hard working compassionate young ophthalmologist who has focused her energy on making a difference for her patients – and her colleagues."

JOSEPH NEZGODA

RETINA PHYSICIAN AND SURGEON AT FLORIDA EYE MICROSURGICAL INSTITUTE, WELLINGTON, FL, USA

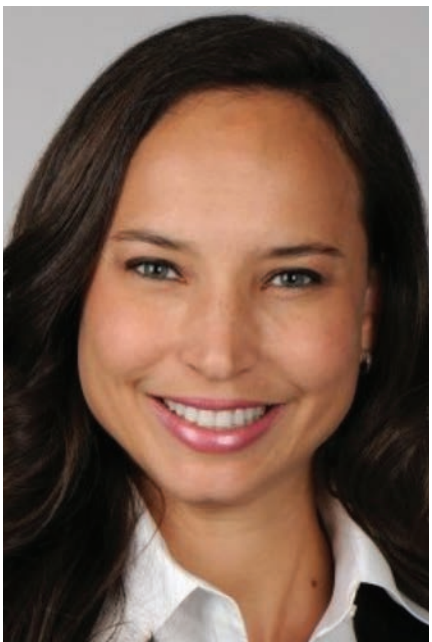
Nezgoda is a fellowship-trained retina specialist focusing on the medical and surgical treatment of macular degeneration, diabetic retinopathy, retinal detachment, and inflammatory eye disease. He studied at UMDNJ-Robert Wood Johnson Medical School (now Rutgers University), where he received several named scholarships including the Gold Humanism Honor Society, and the Excellence in Teaching Award "in honor of dedicated service to clinical skills education in the preclinical years" for being the first coordinator of the Student Teaching Elective – he was the only non-faculty member to receive this award. For his contributions to the field, Nezgoda received the prestigious Leadership in Medicine Award from the American Medical Association, and the Achievement Award of the AAO. He has trained at Mt. Sinai (NY), The Cleveland Medical Center, The University of California-San Diego, and has served on numerous editorial review boards, authored several scientific publications, and has presented at numerous meetings. He also serves on the Collections Committee of The Museum of Vision in San Francisco.

KAROLINNE ROCHA

ASSISTANT PROFESSOR OF OPHTHALMOLOGY, MEDICAL UNIVERSITY OF SOUTH CAROLINA (MUSC), CHARLESTON, SC, USA

Here's what a nominator had to say: "Rocha is an optics expert, tremendous researcher, great speaker, and delightful person. She is one of a handful of young women that will forever influence our wonderful profession."

Rocha specializes in cataract, cornea, and refractive surgery at MUSC - Storm Eye Institute. She has received several awards and distinctions for excellence in ophthalmology including the AAO Achievement Award in 2012, the ASCRS foundation resident excellence award in 2012 and the Cleveland Clinic Lerner College of Medicine teaching excellence recognition award in 2013. Rocha is active in clinical research, having published over 100 scientific works including peer review publications, book chapters, and abstracts in society meetings.



Supporting Ophthalmology's Leaders of Tomorrow

The 2017 Ophthalmologist Power List celebrates those outstanding individuals who have been recognized by their peers as having the inspirational qualities of a future leader in ophthalmology. These are the eye care professionals that will shape the future of eye care. Here, our industry sponsors tell us why their work with those in the early stages of their career is so important to them and to ophthalmology's future…

Jim Mazzo
Global President Ophthalmic Devices,
Carl Zeiss Meditec

What initiatives is ZEISS involved in that support ophthalmologists in the early stages of their career?
ZEISS is totally committed to engaging and supporting young ophthalmologists early in their career. An important element of achieving this is by our significant investment in clinical education, such as resident educational events, on a local, regional, national and international level. We actively encourage and support young ophthalmologists as they refine their surgical and clinical skill, as well as engaging them on emerging technology and how it can be adopted into practice to advance care.

What importance does ZEISS place on working with early-stage career ophthalmologists?
ZEISS' success has been founded on two interwoven fundamentals: our technological expertise and our close collaboration with doctors. ZEISS' innovations in medical technology – many now the standard of care – would not have been possible without close collaboration with doctors – those with years of experience, but also the "rising stars" who bring new ideas and fresh perspectives. After all, the rising stars of yesteryear have helped shape eye care and ophthalmology as we know it today, and today's rising stars will shape our future.

What impact will tomorrow's leaders have on the future of ophthalmology?
Here's one example: ZEISS closely collaborates with ophthalmologists and clinical researchers in the Advanced Retina Imaging Network (ARI). They have an opportunity to build investigator-led research studies across the ARI Network to gain a deeper understanding of retinal disease in ways never seen before by utilizing ZEISS' PLEX Elite Swept Source OCT / OCT Angiography platform. The Network gives them an opportunity to mentor rising stars and to publish their results helping the entire retina community. Using an advanced online collaboration platform, the ARI researchers around the world collaborate with each other and the scientists and engineers at ZEISS to develop tools and technologies that further advance research and allow OCT technology to be refined for broader use in the future. Many researchers in ARI are veterans of ophthalmology, but many are young rising stars who are pushing the boundaries of discovery, and with it, the future of medicine.

What characteristics make an ophthalmologist one of tomorrow's leaders?
New technologies like SMILE, ZEISS Cataract Suite markerless, and the integrated data management platform, FORUM from ZEISS, are changing clinical practice today – improving workflow and patients' outcomes. The ARI Network with ZEISS PLEX Elite is already advancing retinal research at a rapid pace, and with it, clinical practice. An ophthalmologist that adopts these technologies, and even moreso, participates in their development will, without a doubt, change the face of ophthalmology.

ZEISS

www.zeiss.com/med

Tom Frinzi
Worldwide President, Surgical
Johnson & Johnson Vision

What initiatives is Johnson & Johnson Vision involved in to support ophthalmologists in the early stages of their career?

Johnson & Johnson Vision is committed and dedicated to partnering with leading institutions around the world, in fact Johnson and Johnson is currently in over 100 teaching institutes globally. We will continue our best efforts in working with major residency programs to conduct research and development, explore advancement in technology, and manage information sharing programs – influencing those who continue to pursue the field.

What importance does Johnson & Johnson Vision place on working with early-stage career ophthalmologists?

Johnson & Johnson Vision has been an active member with the Millennial Eye Symposium, an organization focused on the development and mentorship for ophthalmologists under 40, for many years. We will continue to play a key part giving ophthalmologists exclusive access to special training programs with state-of-the-art equipment and connecting them to our unique network of professionals and KOLs with deep expertise.

What impact will tomorrow's leaders have on the future of ophthalmology?

As the next generation of leaders comes forward, their impact will be similar to many of their predecessors and mentors. There is a substantial unmet need in eye health that needs to be addressed and I believe many of them will go on to drive innovation in technology and become pioneers of new surgical procedures – paving the path for future leaders. The stakes are high with 50% of the world's population needing vision correction and only 10% are treated.

What characteristics make an ophthalmologist one of tomorrow's leaders?

Intellectual curiosity for technology and a passion for exploring new ideas will be influential for any ophthalmologist. An ophthalmologist must also bring with them drive and determination for better patient outcomes. Someone working in this challenging, but rewarding field must be committed to improving and restoring sight for people around the world. That determination to succeed will serve them well as their career develops into tomorrow's leader.

Johnson & Johnson VISION

www.jnjvision.com

Mike Ball
Division Head and CEO, Alcon

What initiatives is Alcon involved in to support ophthalmologists in the early stages of their career?

We host comprehensive educational programs around the world, including at the Alcon Customer Experience Center. The Center offers an immersive training environment, complete with exam lanes and enhanced wet labs, for both new and experienced practitioners. In addition, our Hospital Account Managers work with residents and attending physicians to educate and train future ophthalmologists, and we also partner with the ASCRS YES program to provide unrestricted educational grants to help train new surgeons.

What importance does Alcon place on working with early-stage career ophthalmologists?

As an industry leader, we recognize that our dedication to improving patients' lives through innovation can only be realized through our long-term partnerships with our customers. These relationships often begin at the early stages of their medical journeys. We aim to serve as a trusted partner for doctors throughout their careers because their insights are critical in shaping our strategy and product pipeline.

What impact will tomorrow's leaders have on the future of ophthalmology?

Tomorrow's leaders are key in helping us identify the industry's unmet needs. Working closely with Alcon development teams, these individuals help advance unmet needs through product ideation and development, with the potential to see their contributions come to life in the operating theater in the future. This partnership is critical to the improvement of patient outcomes and quality of life through innovation.

What characteristics make an ophthalmologist one of tomorrow's leaders?

An unwavering goal of raising the bar in patient outcomes, with the initiative to continually improve one's skill sets through innovation and new techniques, is critical. For instance, patient expectations continue to evolve as people now live their lives on mobile devices. Adoption of advanced IOL technologies will be a necessity for many practices. As patients evolve, industry and surgeons must also evolve.

Alcon A Novartis Division

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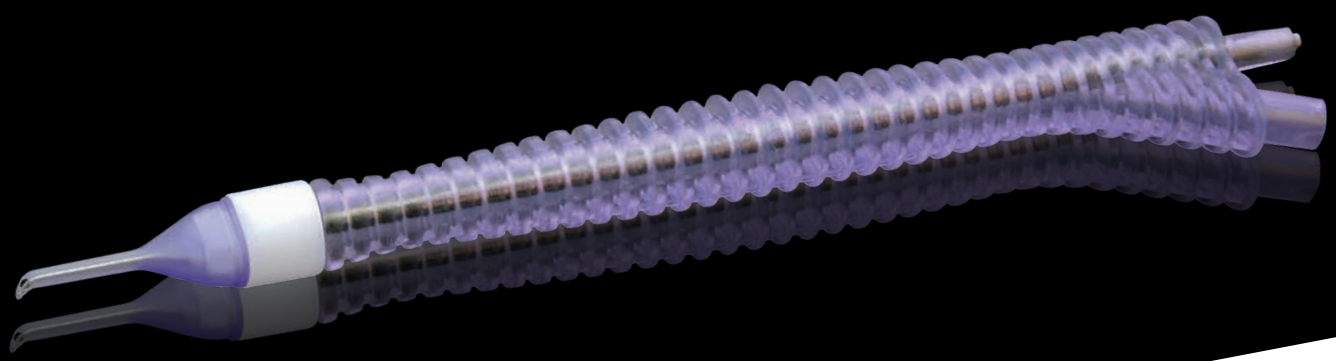

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KAWEH MANSOURI

CONSULTANT OPHTHALMOLOGIST, GLAUCOMA CENTRE, MONTCHOISI CLINIC, LAUSANNE, SWITZERLAND

As well as being a consultant ophthalmologist at Montchoisi Clinic, Lausanne, Switzerland, Mansouri is also an Adjunct Associate Professor at the Department of Ophthalmology at the University of Colorado. He pioneered the use of 24-hour IOP-monitoring technology for patients with glaucoma by contributing to the development of the IOP-sensing contact lens, Triggerfish, and was the first ophthalmologist to give a TEDx talk. A MIGS pioneer, Kaweh leads many instructional courses at international meetings and has over 65 peer-reviewed publications to his name. Mansouri is an avid skier, and if he is not in the office, he is in the mountains.

A nominator said: "In my humble view, Mansouri is by far one of the most gifted clinical talents across all relevant ophthalmological bases: clinical and surgical expertise, his 'what's possible' attitude to research and future industry trends, his collaboration with industry, and his ability to communicate effectively with colleagues and patients."

LEJLA VAJZOVIC

ADULT AND PEDIATRIC RETINA SURGEON, DUKE EYE CENTER, DUKE UNIVERSITY SCHOOL OF MEDICINE, DURHAM, NC, USA

Vajzovic is a member of the Duke Pediatric Retina and Optic Nerve Center with specific expertise and interest in advanced pediatric retinal surgery, and the director of the Duke Center for Artificial and Regenerative Vision where she implants the Argus II "bionic eye" and restores vision to individuals with total blindness. She has a great enthusiasm for teaching the next generation of retinal surgeons and organizes and directs several national and international courses such as Advances in Pediatric Retina Course and the Duke Fellows' Advanced Vitreoretinal Surgery Course. With interests in retinal implants and stem cell technology, Vajzovic's scientific contributions focus on histopathology of various ocular tissues and the development of neurosensory retina in healthy and diseased eyes. Vajzovic has received numerous honors and awards for excellence in clinical care and ophthalmology research, including the Retina Society Fellowship Research Award, the Heed Ophthalmic Fellowship Award, the Society of Heed Fellows Award, and the ASRS Honor Award. Married with two children, her favorite activity is spending time with her family, but she also enjoys downhill skiing, having qualified for an Olympic racing team during her childhood years in Bosnia and Herzegovina.

MARCONY SANTHIAGO

PROFESSOR OF OPHTHALMOLOGY AT THE FEDERAL UNIVERSITY OF RIO DE JANEIRO AND THE UNIVERSITY OF SAO PAULO, BRAZIL; ADJUNCT PROFESSOR OF OPHTHALMOLOGY AT THE UNIVERSITY OF SOUTHERN CALIFORNIA, USA

Santhiago's areas of expertise include corneal and intraocular refractive surgical procedures including LASIK, premium laser-assisted cataract and IOL surgery, and the management of corneal ectatic disorders. His primary research focus is the identification and management of corneal ectatic diseases, including keratoconus and post-LASIK ectasia, and corneal cross-linking protocol development.

A nominator said: "Marcony is an extremely thoughtful person who is full of great ideas and always gives inspiring talks. He has received more than 15 international awards and has provided significant contributions to the field of ophthalmology. At only 37 years old, he's a professor and PhD mentor at the most respected university in his country. He is also the associate editor of JRS and section editor of JCRS.

Marcony is a young ophthalmologist that has become a leader in refractive surgery. Among his contributions, he identified a previously unknown risk factor for ectasia: the percentage of tissue altered."

MARTIN DIRISAMER

CORNEA CONSULTANT
AT THE DEPARTMENT OF
OPHTHALMOLOGY, UNIVERSITY
MUNICH (LMU), GERMANY

Dirisamer is also co-owner of the Smile Eyes refractive laser clinic in Linz, Austria. In 2010, he undertook a one-and-a-half year fellowship with Gerrit Melles at the Netherlands Institute for Innovative Ocular Surgery in Rotterdam, during which he gained an international reputation in the field of modern corneal transplantation.

He has published over 30 articles about DMEK and was the first author on the publication that described the Descemet membrane endothelial transfer procedure for the first time. He received his habilitation in 2015… and by all accounts, is an expert amateur winemaker.

One nominator said: "Martin is one of the most gifted young corneal surgeons and researchers I've seen to date. His research on endothelial cell migration and regeneration in DMEK surgery, and his first description of the DMET procedure shows that even at his young age, he has already made a huge difference to our understanding of corneal endothelial cell disorders. I believe his work will eventually rank up there along with the likes of Melles and Barraquer."

MATUS REHAK

PROFESSOR OF OPHTHALMOLOGY,
THE UNIVERSITY OF LEIPZIG,
GERMANY

A retina surgeon and anti-VEGF expert, Rehak's research interests include retinal vascular diseases, such as diabetic retinopathy and retinal vein occlusion, and ocular oncology. His research work is starting to reveal how the molecular and anatomical changes in these disease states are linked, and he has been involved in the clinical evaluation of anti-VEGF and laser treatment strategies for retinal occlusive disease. He also has an interest in radiation and proton beam therapy (PBT) for intraocular tumors, and his work has helped define predictive risk factors for retinopathy and optic neuropathy after PBT, helping improve treatment choices and the safety profiles when using these treatment modalities.

A nominator said: "Rehak is ambitious in spreading knowledge, works cooperatively and makes patient-orientated decisions. A skilled specialist on difficult disease states of the retina, he has a friendly and open character."

MONIKA FLECKENSTEIN

CLINICIAN-SCIENTIST, DEPARTMENT OF OPHTHALMOLOGY, UNIVERSITY OF BONN, GERMANY

Fleckenstein is a world expert in the field of AMD and retinal imaging, and her seminal research work has substantially contributed to the understanding of the disease manifestation and natural history of geographic atrophy. As the head of the Clinical Trial Center at the Department of Ophthalmology, University of Bonn, Germany, Fleckenstein has a special focus on the design, conduct, and analysis of interventional clinical trials of retinal disease therapies, and it's this expertise in clinical trials that has led to her membership of the University of Bonn's institutional review board/independent Ethics Committee. She is also a co-founder of Young European Retina Specialists (YOURS), an initiative to promote interaction and collaboration between young retinal specialists within Europe. In her free time, Fleckenstein loves to watch her children's soccer games.

NETAN CHOUDHRY

FOUNDER AND MEDICAL DIRECTOR OF VITREOUS RETINA MACULA SPECIALISTS OF TORONTO, ON, CANADA

Choudhry is an internationally recognized and renowned vitreoretinal surgeon, with affiliations at both the University of Toronto and Harvard Medical School, and is a faculty member at the Cleveland Clinic Canada (in Toronto). A leader in retinal imaging and the diagnosis and treatment of rare disorders of the retina and vitreous, Choudhry was the first to pioneer OCT imaging of the peripheral retina, and he is actively developing novel devices for imaging the retina and vitreous using non-invasive technology. Choudhry has published several book chapters in retinal medicine and wide-field imaging and has received research grants to investigate diabetic retinopathy, AMD, macular holes/puckers and uncommon conditions such as retinitis pigmentosa and macular telangiectasia. In his spare time, he enjoys taking his kids to watch the Toronto Maple Leafs hockey team play.

A nominator said: "Netan Choudhry has become a pioneer in OCT retinal imaging over the last several years. He has developed novel techniques and helped image the retinal periphery as never before seen. He had a landmark publication in Ophthalmology in 2016 and has followed up with a swept-source OCT evaluation of the retinal periphery. Choudhry is changing the way we view the retinal periphery, and how we use our OCT machines."

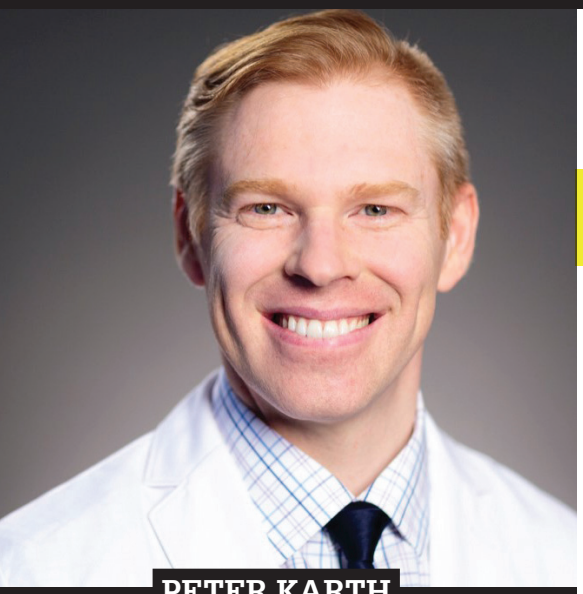
PATRICIA UDAONDO

FACULTY MEMBER, DEPARTMENT OF OPHTHALMOLOGY, NEW UNIVERSITY AND POLYTECHNIC HOSPITAL LA FE, VALENCIA, SPAIN; CO-FOUNDER AND MEDICAL DIRECTOR OF THE AIKEN CLINIC IN VALENCIA

Author of over 70 PubMed-listed publications, Udaondo has received the highest honors (best CV) from the Hospital General Universitario de Valencia, where she specialized in ophthalmology. She's undertaken rotations at La Paz University Hospital in Madrid and the Wilmer Eye Institute at Johns Hopkins University in the past. Today, she's a leading light in age-related retinal diseases, particularly DME, and she is a regular speaker at international congresses and symposia.

Outside of work, Udaondo loves sport; her next challenge is an Iron Man (half-distance triathlon) in Mallorca in May. She also likes animals: her pets include a parrot, a turtle, and a dog. She loves to live with – and for – music: she listens to music whenever she's performing surgery, training or just walking.

Here's what a nominator had to say about her: "Bright, hard working, does a lot of research, and founded a big clinic that serves all of her area."



PETER KARTH

PHYSICIAN AT OREGON EYE CONSULTANTS AND ADJUNCT ASSISTANT CLINICAL PROFESSOR, STANFORD UNIVERSITY, CA, USA

In addition to patient care, Karth is active in health tech, teleophthalmology, AI, and medical devices. He is a co-founder of a medical device/health tech start-up and also consults for Silicon Valley's most prestigious tech firms, including Google and Apple. A regular contributor to many popular and peer-reviewed publications who presents at national and international events, Karth is also one of ophthalmology's most active proponents of physicians in social media.

A nominator said: "Peter is tremendously dedicated to finding novel solutions to issues in the field of ophthalmology – I worked with him on developing a novel mobile app for vision testing and monitoring, which proactively detects the progression of retinal diseases. His dedication and contributions to the technological advances in this field, both with his work in industry and academia, make him a clear rising star in ophthalmology."

RANYA HABASH

CHIEF MEDICAL OFFICER, EVERBRIDGE; ASSISTANT PROFESSOR OF OPHTHALMOLOGY AT BASCOM PALMER EYE INSTITUTE, MIAMI, FL, USA

Habash was named to Castle Connolly's elite America's Top Doctors list for 2015, and was named Young Ophthalmologist of the Year in 2008 by the Florida Society for Ophthalmology, then served as its President-elect. She is also deeply involved in the information technology aspect of medicine, as Chief Medical Officer of Everbridge and Co-Founder of HipaaBridge. She was listed by Becker's Hospital Review as a Top Healthcare Entrepreneur to Know for 2016.

A nominator said: "Aside from being faculty at Bascom Palmer, Habash is the Chief Medical Officer for a global software company, striving to put better tech into medicine. She is also working to implement tele-retina and second opinion consults for patients who need better access to the experts at Bascom Palmer."

R. STERLING HARING

INJURY RESEARCHER, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, BALTIMORE, MD, USA

Haring has published many studies on ocular injuries and trauma, and his research was listed among JAMA Ophthalmology's "most talked about in 2016." He is actively involved in increasing awareness of ocular injuries and is frequently featured in print, online and broadcast media discussing his research findings. He has also been involved in shaping injury prevention laws in the states of Maryland and Florida. Haring is fluent in Russian, was once a door-to-door salesman, and enjoys fishing in his spare time.

A nominator said: "Haring's research has established him as a standout in the field of ocular trauma and injury epidemiology. Three of his papers in the past 6 months have been among the 'most talked about' studies in ophthalmology. Despite his young age and status as an early-career researcher, his work has been featured twice in the New York Times, as well as the Today show, CNN, BBC, and dozens of television, radio, and internet outlets across the country and the world. His work aims to reduce the incidence of critical eye injuries through correct understanding, awareness, and evidence-based prevention mechanisms, and he continues to work with media and government partners in getting these messages to key stakeholders, patients, and parents."

STEFFEN SCHMITZ-VALCKENBERG

ASSISTANT MEDICAL DIRECTOR OF THE DEPARTMENT OF OPHTHALMOLOGY, UNIVERSITY OF BONN, GERMANY

Schmitz-Valckenberg's research focuses on AMD, retinal imaging, fundus autofluorescence and molecular imaging. He has contributed to over 90 publications and 16 book chapters and acted as co-editor of the Atlas of Fundus Autofluorescence Imaging. He predicts that the next big advance in ophthalmology will be the increasing number of intravitreal agents available for the treatment of retinal diseases as well as the more precise longitudinal structural-function analysis of retinal diseases.

A nominator said: "Schmitz-Valckenberg has made major contributions to the field of retinal imaging and biomarkers in the context of geographic atrophy due to AMD, and he is an internationally renowned expert on fundus autofluorescence imaging by confocal scanning laser ophthalmoscopy. He also has a huge array of high-ranked, peer-reviewed scientific publications and is a recipient of various scientific awards."

SOPHIE BAKRI

PROFESSOR OF OPHTHALMOLOGY, VITREORETINAL DISEASES AND SURGERY, MAYO CLINIC, ROCHESTER, MN, USA

Bakri considers her work in describing the pharmacokinetics of intravitreal therapies as one of her biggest achievements so far, and has hopes that her current work on new pharmacotherapies for retinal vascular diseases, such as AMD and diabetic retinopathy, will result in more convenient and effective ways to treat patients.

Bakri has published more than 150 peer-reviewed papers and 20 book chapters on ophthalmology. She is a principal investigator on several multicenter clinical trials on novel drugs for retinal disease. She is editor-in-chief of the book "Mayo Clinic on Vision and Eye Health," and serves on the editorial boards of the American Journal of Ophthalmology; Retina; Seminars in Ophthalmology; and OSLI Retina.

She has served the Macula Society as a meeting planning chair and an executive committee member, and is on the Retina Society's nominating committee. She has also served as co-director of the Vision 2020 Initiative, and is a board member and on the program committee of the American Society of Retinal Specialists.

She has received several awards, including being a member of The Ophthalmologist Top 40 under 40 Power List in 2015, an Achievement Award from the AAO, an honor award from the ASRS and inclusion among Becker's 135 Leading Ophthalmologists in America list.

One nominator described her thus: "Thought leader, innovator, cutting-edge research and clinical care."

SUI CHIEN WONG

CONSULTANT OPHTHALMIC SURGEON, GREAT ORMOND STREET HOSPITAL FOR CHILDREN; MOORFIELDS EYE HOSPITAL; ROYAL FREE HOSPITAL, LONDON, UK

Chien is among a handful of doctors in the world with a specialist practice in pediatric vitreoretinal surgery and retinovascular diseases, in addition to his adult vitreoretinal work. He treats and supports patients and their families with complex pediatric retinal disorders at Great Ormond Street Hospital for Children (GOSH), Moorfields Eye Hospital and the Royal Free Hospital. He is one of very few surgeons in the world with expertise in using endoscopic vitreoretinal surgery across a spectrum of adult and pediatric diseases, but particularly in acute retinopathy of prematurity (ROP) retinal detachment. He is a member of a multidisciplinary pediatric vitreoretinal surgical team from GOSH, Moorfields Eye Hospital and the Oxford Eye Hospital offering a comprehensive specialist service to children and their families.

Chien is active in clinical research including OCT angiography imaging in Coats' disease, familial exudative vitreoretinopathy and incontinentia pigmenti. He is also the UK Chief Investigator and Moorfields Eye Hospital Principal Investigator for the RAINBOW phase III clinical trial, an international randomized controlled trial comparing intravitreal ranibizumab to standard-of-care retinal laser.

WILLIAM MAPHAM

REGISTRAR AT THE OPHTHALMOLOGY DEPARTMENT OF TYGERBERG HOSPITAL IN CAPE TOWN, SOUTH AFRICA; FOUNDER, VULA MOBILE

Mapham has served as the Vice Chair of the Rural Doctors Association of South Africa (RuDASA), and previously spent time in New York and Washington D.C. designing mobile phone applications for healthcare. He has published academic articles on the role of innovation and technology in improving healthcare delivery and has extensive experience in rural health care. He is the creator of Vula, a smartphone app that provides healthcare workers with basic ophthalmic diagnostic guidelines, and connects them with an ophthalmologist who can provide advice, respond to queries, and accept referrals in real time. Mapham's three largest expenses are books, rare cheeses, and crowdfunding for experimental electronic gadgets.

His mentors have described him as a gifted and outstanding surgeon whose promise was evident as a Moorfields resident, when he was the best performing trainee in a surgical motion-tracking study published in Ophthalmology.

Since early 2014, he has worked closely with the Armenian EyeCare Project to train two leading Armenian surgeons to treat babies and young children with blinding retinal disease (including ROP) at the AECP national surgical center in Yerevan, including mentoring via live telesurgery, in a partnership between GOSH and Children's Hospital Los Angeles.

He has recently caught the ski bug with his two beautiful young boys.

YOSHI YONEKAWA

ADULT AND PEDIATRIC RETINA SURGEON, MASSACHUSETTS EYE AND EAR INFIRMARY AND BOSTON CHILDREN'S HOSPITAL OF HARVARD MEDICAL SCHOOL, MA, USA

Yonekawa directs the pediatric retina surgery program at Boston Children's Hospital, and he is also adjunct faculty at Kyorin University in Tokyo, Japan. Yonekawa received his MD with honors from Weill Cornell Medical College, completed his ophthalmology residency at Harvard Medical School, and underwent fellowship training in adult and pediatric retina surgery at Associated Retinal Consultants/ William Beaumont Hospital, Michigan. His expertise has been recognized by numerous awards, including those from the Heed Ophthalmic Foundation, Ronald G. Michels Foundation, and the Retina Society. Yonekawa has also contributed over 150 original papers, editorials, and book chapters to the field, and he serves as Assistant Editor for the journal Retina, and as Deputy Editor of the Journal of VitreoRetinal Diseases. In his spare time, he enjoys spending time with his wife and three boys.

A nominator listed the following reasons for his nomination: "Yonekawa is a rising star in pediatric vitreoretinal surgery, he has an incredible number of publications, he is surgically extremely talented, as well as a great teacher and mentor for residents and fellows."

10. C. ANDRÉS BENATTI

CORNEA AND REFRACTIVE SURGEON, ASSOCIATE PROFESSOR AND DIRECTOR OF TEACHING AND RESEARCH AT CLINICA DE OJOS CÓRDOBA, CÓRDOBA, ARGENTINA

Benatti is a cornea and refractive surgeon with extensive experience of LASIK, corneal transplantation and managing patients with keratoconus – and yet is aged only 31 years. In 2015, he was identified by the Argentinian Council of Ophthalmology as one of the "prominent young ophthalmologists of Argentina" and earlier this year was featured as "surgeon of the month" by the International Society of Refractive Surgery – one of the youngest surgeons ever to have this honor.

He is a co-founder of the international corneal ectasia study group, Apectasias, and OftalmoUniversity.com, the first Latin-American web platform for ophthalmologists that offers news and online ophthalmology educational courses. A former International Fellow at UC San Diego Shiley Eye Institute, he is also a section editor for the AAO's EyeWiki, and actively participates in different ophthalmology societies and educational platforms such as Cornea Society, AAO, ISRS, and CAO.

Benatti dedicates a lot of his time to philanthropic work. He regularly works with the Asociación para Evitar la Ceguera (APEC) en México, the largest eye hospital in Mexico City, and one that's dedicated to treating patients with low incomes – an institute he previously trained at. Benatti also supports, as an external advisor, the Ojos para mi país Foundation, a Mexican organization that aims to prevent blindness in the countryside, and is soon going to launch a non-profit organization, the Argentinian Foundation Against Blindness.

9. CHELVIN SNG

CONSULTANT OPHTHALMOLOGIST, NATIONAL UNIVERSITY HOSPITAL, SINGAPORE; ASSISTANT PROFESSOR AT THE NATIONAL UNIVERSITY OF SINGAPORE; HONORARY CONSULTANT AT MOORFIELDS EYE HOSPITAL, LONDON, UK

Sng graduated as the top medical student from Gonville and Caius College in Cambridge University with triple First Class Honors and distinctions, and has received several international awards from the ASCRS, AAO, ARVO, and the Australian and New Zealand Glaucoma and Interest Group. She was also named as the most outstanding candidate in her year for the Ophthalmology Specialist Accreditation Examination in Singapore, with Gold Medals conferred for being the best candidate in Glaucoma, Cataract and Refractive Surgery, Neuroophthalmology and Pediatric Ophthalmology.

A former Moorfields glaucoma fellow, she has gone on to be a pioneer of MIGS surgery in Asia, being the first Asian surgeon accredited to use several of the MIGS devices now available, including the iStent Inject and the XEN-45 implant. With a plethora of peer-reviewed publications and book chapters and positions on journal editorial advisory boards to her name – Chelvin was Lead Guest Editor of a Special Edition on MIGS in the Journal of Ophthalmology – and having secured over S$1.7 million in research funding, she also finds the time to volunteer for medical missions to less developed areas of South East Asia and India and is a Visiting Consultant to the Chinese Foundation for Lifeline Express, where she lectures and provides clinical and surgical training to local Chinese ophthalmologists.

8. ANTHONY KHAWAJA

CLINICAL FELLOW, GLAUCOMA SERVICE, MOORFIELDS EYE HOSPITAL, LONDON, UK; HONORARY CLINICAL RESEARCH FELLOW AT THE UNIVERSITY OF CAMBRIDGE AND UNIVERSITY COLLEGE LONDON, UK

Khawaja completed the prestigious Wellcome Trust PhD program at the University of Cambridge, winning the Nick Day Prize for epidemiology, and he also won the Berkeley Fellowship Award supporting a research program at Harvard Medical School during which time he developed a novel algorithm for analysis of genome-wide data. He established and chaired the Young Ophthalmologists (YO) section of the SOE and has been an active member of the AAO's YO committee. The YO brand is now growing globally and Anthony has helped establish YO groups for other supranational societies, PAAO, APAO, and MEACO.

An active member of multiple international consortia examining the genetic and environmental epidemiology of eye diseases including the International Glaucoma Genetics Consortium (IGGC), the Consortium for Refractive Error and Myopia (CREAM) and the European Eye Epidemiology (E3) consortium, his primary research passion is discovering the biological processes underlying glaucoma by examining genetic, epidemiological and real-world data. He believes we have a duty to harness the potential knowledge in routinely collected data to better the care of our patients. He has also won several prizes including the Moorfields Research Medal, the Royal College of Ophthalmologists Foulds Trophy and the AAO Secretariat and Achievement awards. In 2016, he was awarded the Moorfields Research Medal. Not much of a physical sportsman, Anthony's team activities at University were chess during medical school and pool during his PhD.

One nominator said: "Multi-skilled in epidemiology, genetics, statistical methods, imaging and population research, Anthony is a globally recognized and sought after researcher. He is actively collaborating with colleagues in Boston MA, Durham NC, Singapore and Rotterdam, as well as around London, Cambridge, and the wider UK, to make breakthrough advances in eye care. Definitely 'one to watch'."

7. MARCUS ANG

CONSULTANT, CORNEA SERVICE, SNEC AND ASSISTANT PROFESSOR AT DUKE UNIVERSITY – NUS, SINGAPORE

A recent graduate of the Asia Pacific Academy of Ophthalmology's Leadership Development Program, Ang is a widely published author with five book chapters and over 88 peer-reviewed publications to his name, the majority of which are first or corresponding author in journals with impact factors >2.0 (he has an h-index of 20). His research work is mostly translational, such as studying prognostic factors to help improve outcomes following corneal transplantation, and this work has been recognized with several international awards. Indeed, Ang was the recipient of the 2014 Singhealth Excellence Award – Distinguished Young Researcher, and he also holds several patents related to his specialist field. He has also undertaken voluntary Ophthalmology work in the community, leading volunteer missions to Asia and beyond in his role as Director of Vision Projects at the Singaporean non-profit organization, Global Clinic, where he regularly organizes missions and travels to provide free cataract surgery in countries such as Indonesia, Thailand, Cambodia, India and Myanmar.

6. BOBECK MODJTAHEDI

OPHTHALMOLOGIST, SOUTHERN CALIFORNIA PERMANENTE MEDICAL GROUP (SCPMG), BALDWIN PARK, CA, USA

Modjtahedi is a vitreoretinal surgeon and Director of the Electrophysiology and Retinal Degeneration service at SCPMG, and also supervises their Eye Monitoring Center tele-ophthalmology program. He completed his vitreoretinal surgery fellowship at the Massachusetts Eye and Ear Infirmary where he was a Heed Fellow and received the "Fellow of the Year" award. A recipient of some of the highest awards at each stage of his career, he was a Regent Scholar as well as a recipient of University Medal, Leadership Council Walter Rohrer Scholarship, and the University of California, Davis' "Outstanding Young Alumni Award."

He is the principal investigator for several multicenter projects, the Associate Editor for "Cutaneous and Ocular Toxicology," a reviewer for multiple journals, and collaborates with leading technology companies. His publications have helped shape the standard of care in multiple medical disciplines: he is a leading authority on imaging, pharmacology, immunology, toxicology and new device development. His current research aims to improve patient outcomes by analyzing complex "big data" to uncover unique insights. He is additionally working on improving healthcare access internationally and has been described as having "devised novel paradigms and spearheaded ground-breaking projects that promise to fundamentally alter the way healthcare is delivered."

One nominator said: "At a young age he has already established himself as a leader in the field. He has already made valuable contributions to the scientific literature and is currently working on a number of large-scale projects that will help shape the future of our field. His work has, and will continue to, tangibly effect the day-to-day management of patients."

5. PEARSE KEANE

CONSULTANT OPHTHALMOLOGIST, MOORFIELDS EYE HOSPITAL, LONDON; NIHR CLINICIAN SCIENTIST AT INSTITUTE OF OPHTHALMOLOGY, UNIVERSITY COLLEGE LONDON, UK

Pearse is a retinal specialist at Moorfields Eye Hospital and a researcher at the University College London Institute of Ophthalmology. He specializes in the diagnosis and treatment of AMD and other complex macular diseases, and his research is focused on the application of new technologies to ophthalmology from AI, to virtual reality, to advanced imaging. In 2016, Pearse was responsible for initiating the collaboration between Moorfields and Google DeepMind, with the aim of applying machine learning to OCT image analysis and in 2015, he was a awarded a "Clinician Scientist" award from the National Institute of Health Research (NIHR) – the first ophthalmologist in the UK to receive such an honor. He predicts that the combination of AI with comprehensive, automated eye examination using binocular OCT will reinvent the eye examination for the 21st Century.

4. BORIS STANZEL

CONSULTANT RETINA SPECIALIST AND DIRECTOR, MACULA CENTRE, KNAPPSCHAFT EYE HOSPITAL SULZBACH, SAARBRÜCKEN GERMANY; GROUP LEADER, CLINICAL STEM CELL TECHNOLOGY, FRAUNHOFER INSTITUTE FOR BIOMEDICAL TECHNOLOGY, SAARBRÜCKEN-SULZBACH, GERMANY; SCIENTIFIC CONSULTANT, NATIONAL EYE INSTITUTE, BETHESDA, MD, USA

Stanzel gained international renown for his transplantation of retinal pigment epithelium into the subretinal space of rabbits – a first in a large-eyed animal model, followed closely by successful transplantation into pigs. Recently, he and his colleagues at the Singapore National Eye Centre (SNEC), Singapore Eye Research Institute (SERI), NEI and Tampere University, Finland, have successfully created a non-human primate model platform, guided by intra - operative OCT, for stem cell-based RPE replacement therapy evaluation – bringing this modality a step closer to clinical use. He credits his time at SNEC/SERI as critical to this development. His next goal is to initiate a European cell replacement therapy clinical trial.

One nominator said, "Boris is one of the most gifted researchers around, and his work is truly ground-breaking. I am sure his monkey work evaluating the surgical macular dynamics of cell replacement strategies in macular degeneration will prove to be an important milestone in stem cell research."

3. JOHN BERDAHL

PARTNER AT VANCE THOMPSON VISION, SIOUX FALLS, SD, USA; FOUNDER AND CEO OF EQUINOX, LLC

Berdahl is an ophthalmologist at Vance Thompson Vision specializing in cataract, refractive, corneal and glaucoma surgery. Berdahl has been chosen to take part in the Vision for Mars team, which is working closely with NASA and National Space Biomedical Research Institute to help solve vision problems during long-term space travel. He has a leadership role in EyeCare America, which provides free eye care to the underserved, and is Medical Director of the Dakota Lions Eye Bank.

A MIGS pioneer, his current research efforts focus on understanding the relationship between intracranial and intraocular pressure in glaucoma, fixing astigmatism after cataract surgery, and sublingual anesthesia for eye surgery. His daily joy comes from wonderful relationships with his team-mates and partners at work, while his greatest joys come from any new water adventure with his wife and two children.

One nominator said, "He's a creative thinker about glaucoma and has led the discussion on glaucoma as a two-pressure disease. He's doing very interesting work with goggles that NASA may adopt as well. He is always coming up with interesting ideas but is very down to earth as well." Another said, "Best fellow I ever trained, and I have trained many superstars."

2. ALEX DAY

CORNEAL FELLOW AND LOCUM CONSULTANT, MOORFIELDS EYE HOSPITAL, LONDON, UK

Day is both a surgeon and a scientist. After earning a PhD in 2013, he undertook an NIHR Clinical Lectureship at the NIHR Biomedical Research Centre at Moorfields Eye Hospital and the UCL Institute of Ophthalmology.

His research interests include the anterior segment and big data, and he has published over 45 peer-reviewed papers and is an invited speaker at major conferences on cataract and refractive surgery advances. His PhD work included the contemporarily accepted biometric definitions for microphthalmos and nanophthalmos. Day is a co-author on the UK Royal College of Ophthalmologists' National Ophthalmology Database reports on cataract surgery and a member of the recent UK RCOphth Cataract Surgery Commissioning Guidelines Development Group. He was responsible for the concept and formation of the research group behind the NIHR FACT multicenter randomized controlled trial of femtosecond laser vs. manual phacoemulsification cataract surgery that is due to report next year.

Day says, "My goal is high quality, robust evidence to guide the best possible delivery and outcomes for cataract and refractive surgery."

1. ALEX HUANG

ASSISTANT PROFESSOR, DOHENY AND STEIN EYE INSTITUTE, DEPARTMENT OF OPHTHALMOLOGY, DAVID GEFFEN SCHOOL OF MEDICINE, UCLA, LOS ANGELES, CA, USA

One nominator said: "Alex is an inventor of aqueous angiography, a ground-breaking technique that visualizes real-time aqueous humor outflow for improving the basic understanding of fluid flow in the eye. He is Principal Investigator of several studies that have validated the used of this technology experimentally (post-mortem human eyes and non-human primate live eyes), as well as in human patients. This new technology offers great potential for enhancing and individualizing glaucoma surgery."

Today, Alex Huang is a glaucoma specialist, a founding member of the Doheny Eye Institute and UCLA affiliation, and NIH-supported clinician scientist whose laboratory is developing an aqueous humor imaging technique, aqueous angiography, that should not only help improve our basic understanding of aqueous outflow, but also help optimize the efficacy of interventions that seek to enhance natural outflow pathways – like some MIGS devices. But Alex's story begins with neuroscience, not glaucoma.

His undergraduate degree research included work on axon guidance and hippocampal synaptic transmission. As a MD/PhD candidate at The Johns Hopkins University School of Medicine under Solomon Snyder in the Department of Neuroscience, Alex went on to research atypical amino acids and their role in melanocortin production, melanocortin behaviors, and retinal development – and it was this work that prompted him to pursue residency training in ophthalmology at Doheny Eye Institute

This is when his clinical and research interest in glaucoma really began. It started with a basic science research endeavor with James Tan at UCLA/Doheny that involved them identifying collagen and elastin as the biological origins of endogenous trabecular meshwork autofluorescence in the human eye. After that, he became a Heed Ophthalmic Foundation-supported glaucoma fellow with Robert Weinreb at the University of California, San Diego, where Alex, with Robert, developed the basis for his research program that examined the unstudied and potential post-trabecular meshwork sources of aqueous humor outflow resistance in the eye. This led to an NIH Mentored Clinical Scientist Research Career Development Award, and Alex is also funded by the American Glaucoma Society and Research to Prevent Blindness to develop aqueous angiography into a technique that can be used to visualize outflow in a clinical setting. At home, Alex spends his time with his wife, Maggie, and two young sons, Ethan and Evan, most frequently building Legos probably bought at the Legoland theme park in Carlsbad, California.

For 70 years, Alcon has successfully discovered new ways to enhance sight and improve people's lives. Our breakthrough innovations, strategic acquisitions and partnerships, and a deep-rooted commitment to partnering with and serving eye care professionals are what makes Alcon the global leader in eye care. We offer the most complete line of ophthalmic surgical devices, and are focused on continuously improving the options that exist today while also exploring new disease categories and treatment options.

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Alcon Laboratories is incorporated. In 2017, together with 50 years of phaco, Alcon celebrates its 70th anniversary – 70 years of innovation and partnership with practitioners who connect us with patients and have been our partners in reimagining eye care.

1947

1947

1994

AcrySof® intraocular lens (IOL)

Alcon receives FDA approval for the AcrySof® intraocular lens (IOL), the first time a material had been developed specifically for an IOL. With almost 100 million eyes implanted since then, Alcon continues to make constant innovations in IOL optics and delivery systems.

2008

CONSTELLATION® Vision System

Alcon introduces the CONSTELLATION® Vision System, an ophthalmic microsurgical system indicated for both anterior segment and posterior segment ophthalmic surgery.

2014

ORA SYSTEM®

Alcon acquires WaveTec Vision, developer of the first commercialized intra-operative aberrometry system for cataract surgery, in 2014. The ORA SYSTEM® allows surgeons to evaluate refractive findings, refine IOL power, cylinder power and IOL alignment in real time to provide optimal refractive outcomes in cataract surgery.

2013

CENTURION® Vison System

Alcon introduces the CENTURION® Vison System with Active Fluidics, a next-generation phaco platform that automatically and continuously adapts to changing conditions within the eye, provides excellent anterior chamber stability during each step, and enhances fluidic management and surgical precision.

"CyPass is a game-changer for me and my patients as a less invasive means of lowering IOP than traditional glaucoma surgery, with the goal of lowering the patient's dependence on topical glaucoma medication."

Quang Nguyen, MD

"NGENUITY gives me real benefits in the OR since it enhances my visualization of the back of the eye without having to bend over a microscope, while also helping minimize light exposure to my patient's eye."

George Williams, MD

"Alcon Cataract Refractive Suite innovations, such as LenSx and ORA, help me enter the OR with a game plan that I can execute, which allows me to deliver better patient outcomes."

Lawrence Woodard, MD

2017

2016

NGENUITY® 3D Visualization System

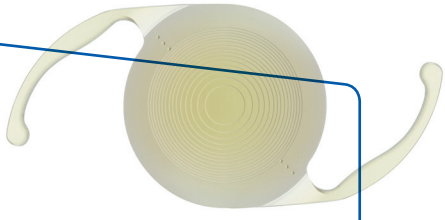
Alcon launches the NGENUITY® 3D Visualization System, designed to enhance visualization of the back of the eye for improved surgeon experience. Retinal surgeons can operate looking at a high-definition 3D screen, instead of bending their necks to look through a microscope.

CYPASS® Micro-Stent device

The CYPASS® Micro-Stent device, the first MIGS implantation into the supraciliary space, receives FDA approval in July 2016 for use during cataract surgery. It is designed to lower IOP by enhancing aqueous outflow through one of the natural drainage pathways of the eye, with minimal tissue disruption, which allows the excess fluid in the eye to drain.

PANOPTIX® trifocal IOL

Alcon launches PANOPTIX® trifocal IOL in some parts of the world in 2015 and receives CE Mark status in November 2016 for PANOPTIX® Toric.



2017

ACTIVEFOCUS™ Optical Design

Alcon receives FDA approval in March 2017 for AcrySof® IQ ReSTOR® +2.5 Multifocal Toric with ACTIVEFOCUS™ design for uncompromised distance vision while correcting astigmatism and presbyopia.

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Don't be disheartened by the scars or the number, pattern or irregularity of radial keratotomy cuts – achieving excellent vision in these eyes is possible using refraction-based, laser corneoplastique

By Arun Gulani and Aaishwariya Gulani

Radial keratotomy (RK) was a very popular technique in the eighties. A series of radial, deep corneal incisions (Figures 1 and 2) flattened the cornea – and corrected myopia. But although it served thousands of patients well at the time, it also resulted in hyperopic shifts over time, creating irregular corneas with long-term visual instability. Now, there are thousands of patients worldwide who underwent RK and are now presenting to their doctors with vision issues – it's essentially a refractive epidemic. But I believe it's possible to "turn back the clock" with the right approach.

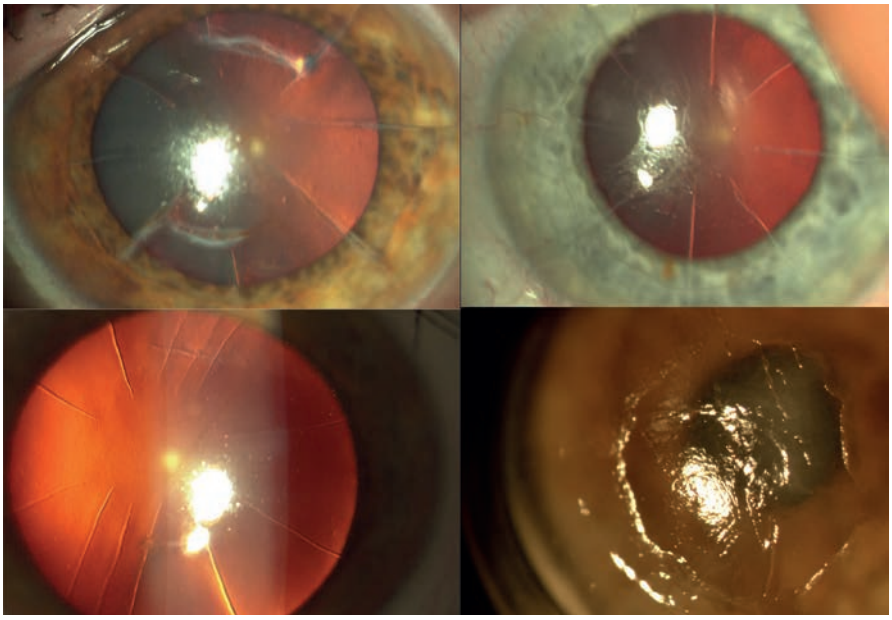

Figure 1. An array of radial keratotomy patterns and incisions – all of which can be addressed using laser corneoplastique.

At a Glance

- *Many prior radial keratotomy patients are now presenting to ophthalmologists with vision problems caused by irregular ametropia, including hyperopic shift over time*
- *These cases can seem daunting, but it's possible to produce great outcomes with the right approach for vision correction*
- *LASIK is one possible approach – but it may cause more problems than it solves, and could further destabilize the cornea*
- *Laser corneoplastique is an advanced form of surface laser surgery involving manual epithelium removal, which helps the cornea heal, and decreases surface irregularities*

Tackling the refractive epidemic head on

The list of potential problems when dealing with post-RK corneas can be long: the size and placement of the incisions and scarring can leave you dealing with a particularly fragile cornea. The next problem is biometry: taking accurate measurements in these eyes can be particularly challenging – and predicting outcomes is also difficult. It's important to always begin surgery with the right mindset: don't be intimidated by the number or pattern of RK cuts you see in your patient's cornea (see Figure 1). Instead, go into surgery with the belief that despite the cuts, it's possible for your patient to achieve unaided emmetropia and 20/20 vision.

There is a whole spectrum of corneal and lenticular techniques that can be used to rehabilitate vision, but I shall restrict the discussion here to the use of my laser corneoplastique approach (1), which can not only correct the full range of refractive errors that can result from RK but also its associated pathologies.

Let's review the "inside-out" and "outside-in" lens implant-based combination protocols.

"Outside-in" is an approach for situations when corneal topography cannot be measured; for example, in cases of corneal scarring, post-RK irregular ametropia, or post-LASIK ectasia. The cornea is first made measurable using procedures like Intacs, lamellar keratoplasty or corneal collagen crosslinking, and then cataract surgery is performed once accurate biometry and IOL calculations can be made. The "inside-out" approach is used when the cornea is measurable but still needs refractive correction – in these cases, the cataract surgery is performed first, with the aim of correcting residual refractive error afterwards using ablation.

Imagine the post-RK cornea as a sheet of well-adhered but broken tiles. The returning epithelium following this laser

surface ablation approach not only covers and heals the cornea but also decreases surface irregularities and instability – over and above the refractive correction achieved with the excimer laser alone. Anecdotally, I have also noted this procedure results in greater vision stability. After over two decades of correcting virtually every variety of post-RK cornea and their associated pathologies to give these patients emmetropic vision, I believe this approach produces the best possible outcomes.

Another option for post-RK corneas is, of course, regular LASIK surgery – but this should be avoided. In my view, LASIK on RK corneas is not the best idea, both anatomically and physiologically: it horizontally destabilizes a structure that is already vertically compromised. Think of a cake cut into eight pieces, nicely held on a platter. Now, take a knife and cut through all eight pieces with a single horizontal swipe – you are highly likely to dislodge some pieces. By performing LASIK on these eyes, you place the patient at a high risk of tissue displacement, refractive fluctuations, corneal ectasia, irregular astigmatism, epithelial ingrowth at flap incision intersections, along with dry eye and tear film instability. Just because the approach works in some cases, doesn't mean it's the best approach here!

"There are thousands of patients worldwide who underwent RK who are now presenting to their doctors with vision issues."

Delicate but decisive

Laser corneoplastique is performed as a no-flap, no-cut, surface ablation technique broadly similar to conceptual photorefractive keratectomy (PRK) surgery, but with advanced protocol and manual epithelium removal. The epithelium should not be removed with alcohol or toxic chemicals, but instead with a blunt, modified diamond-dusted spatula – the Gulani LASIK spatula. I have classified this process into centripetal (removal from the periphery to the center) and centrifugal (removal from the center to the periphery) techniques. I use a centripetal technique in most post-RK cases with no additional corneal issues like prior LASIK surgery, and I find that a centrifugal technique is more applicable in

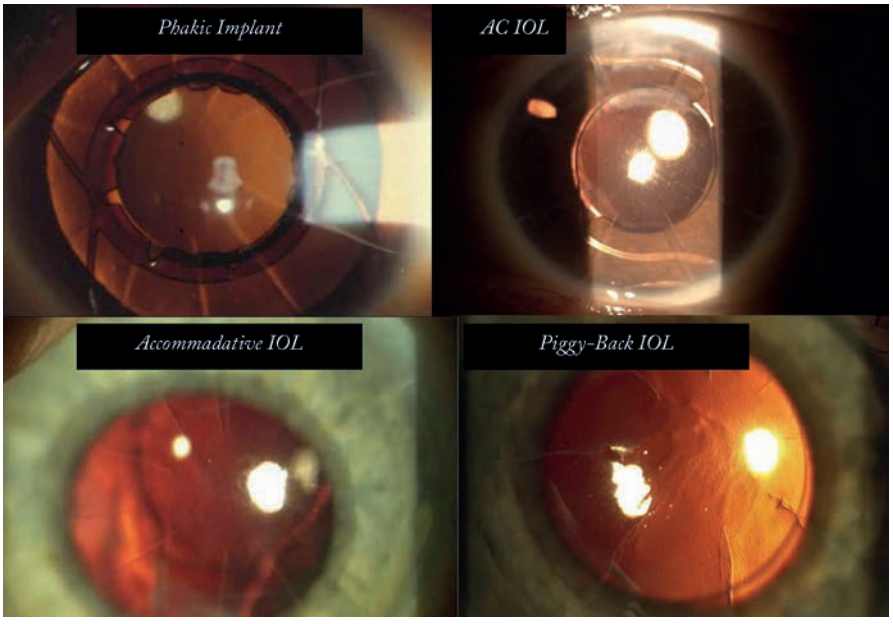

Figure 2. An illustration of RK in eyes that have undergone multiple surgeries, including pseudophakic and phakic IOL implantation.

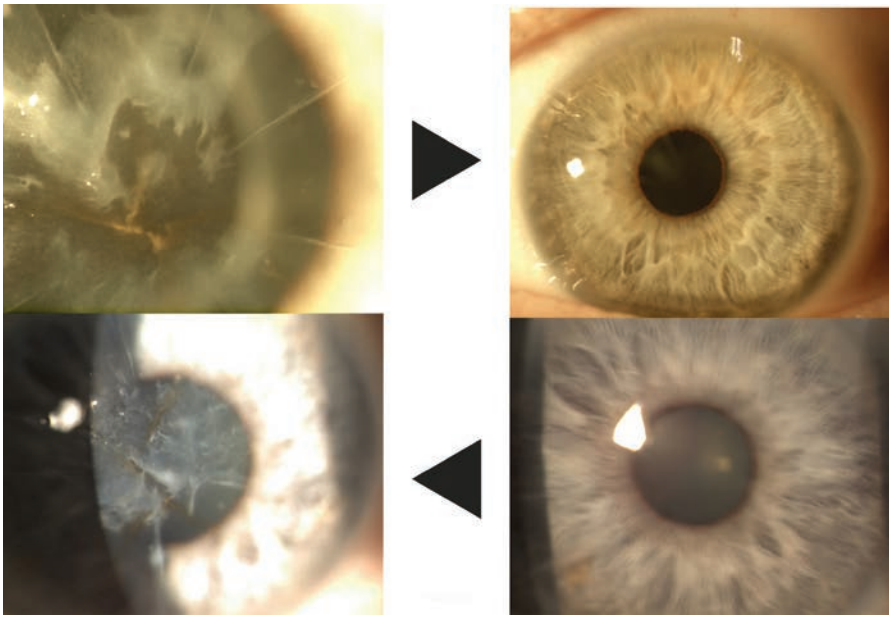

Figure 3. Corneal scars with RK cleared in minutes to plan for inside-out or outside-in cataract surgery.

cases where there are other associated corneal issues, such as LASIK flaps, scars, or very unstable corneas with deep intersecting RK cuts. It's important to bear in mind how fragile these corneas are – your movements should be gentle, but decisive and fast – this will lead to less irregularity and a lower chance of creating false planes including the opening of RK incisions.

Epithelium removal is the most important physical step in these cases – it reveals the underlying cornea and the work of the previous surgeon, and no number of topographies or OCT images can give you this information. The most important step of all comes next: refraction-based laser corneoplastique. Your refraction through these corneas has to be very accurate and you must check it repeatedly during preoperative visits.

Using the 193 nm argon fluoride excimer laser at 120 MJ/cm^2 at a modified pulse frequency, I proceed with ablation, followed by Mitomycin C 0.02% washed by BSS at completion for 20 seconds. In my experience – and in all cases – the patient will begin to see more clearly right there under your laser. Place a bandage contact lens on this cornea, and the procedure is completed.

"Refraction is a must and accuracy is absolutely paramount."

Why should you choose a surface ablation technique, such as laser corneoplastique? In essence, you're taking away all the negatives of incisional keratorefractive surgery (including regular LASIK), so that you are sculpting with a sub-micron precision laser to get the shape you want. You're also able to correct the entire range of refractive errors, address irregular astigmatism, and correct associated corneal scars.

As I always say: refraction is a must and accuracy is absolutely paramount

– in fact, it is the single most important defining factor of your success. The number of cuts, the pattern, or how "horrible" they look doesn't matter at all. A medication protocol of antibiotic and anti-inflammatory drops for two weeks and steroid drops on a taper from 4 to 1 per day over four weeks is followed. I remove the bandage contact lens by day five, and the majority of patients had epithelial closure by this time. No patients reported any pain, even when questioned, underscoring the fact that the surgery is comfortable for patients, and provides vision recovery and results that even these highly demanding patients find satisfactory.

A winning combination

Laser corneoplastique in post-RK eyes can also be combined with cataract surgery, as many of these patients are now of the age where cataract surgery might be indicated, and clearing the cornea of scars or irregular refractive errors with this procedure, combined with cataract removal should lead to the best possible postsurgical visual outcomes (Figure 3).

Excimer laser use – as an advanced version of PRK – in laser corneoplastique mode is a safe, effective and predictable technique to correct refractive errors in post-RK eyes. Instead of weakening an already weakened cornea, the returning epithelium decreases fluctuations, improves anterior corneal smoothness and shape, which, in turn, makes the RK cuts (no matter the number) less relevant visually. It's like placing a new carpet over broken tiles...

Arun Gulani is the founding Director and Chief Surgeon of the Gulani Vision Institute in Jacksonville, Florida, USA and has specialized in over 48 vision corrective techniques including advanced LASIK, premium cataract and custom corneal surgery. An award- winning inventor of numerous surgical instruments and techniques, Gulani is a widely published author and international instructor to eye surgeons worldwide. Aaishwariya Gulani, is a pre-med undergraduate at Wharton School of Business at the University Pennsylvania.

Arun Gulani is a consultant for Ocular Therapeutix, Oculus and MARCO. Aaishwariya Gulani reports no conflicts of interest.

A video of the laser corneoplastique technique is available online at: https://youtu.be/OmPtGwT4eQs.

Reference

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COS He's a Jolly Good Fellow

Sitting Down With... Guillermo Rocha, President of the Canadian Ophthalmological Society (COS), and Medical Director of Ocular Microsurgery and Laser Center, Brandon, Manitoba, Canada.

Photo credit: Jill Thompson

What led you to cornea and refractive surgery?

Even as a child, I wanted to be a physician. There were none in my family but, at junior high, my best friend's father was a hand surgeon. I was intrigued by his life and his passion – he was my first inspiration. What attracted me to ophthalmology is that it is a unique specialty that combines both surgical and medical aspects. I knew I wanted to specialize in cornea and refractive surgery from the get go.

What are your main missions as COS president?

COS has been around for 80 years now, and we really want to mark that in our annual meeting in June. I really want to help promote COS in the international arena. We – and I guess Canadians in general – often tend to be a bit discreet and sometimes overly humble, but we really have a lot of initiatives, projects, guidelines and educational activities going on. I'd like to promote these globally – and garner some support from fellow societies who might like to join us in our unique programs.

More in the national arena, it's all about "the three Os" – ophthalmologists, optometrists and opticians. It's already started in Canada, but one of my goals is to help formalize the formation of provincial eye health councils – collaborative groups that present a single voice to government. More locally and internally at COS, we have a huge responsibility to our membership. As our society has grown, we've really had to define the "COS umbrella" and consider how we're going to keep the different subspecialty and special interest groups engaged; we need to present a single voice for ophthalmology to our patients, the media, the population, as well as government.

What's a normal day like?

Every day is different! Taking into account the 168 hours in a week, I prefer to talk about life balance instead of the usual work-life balance, because everything is important. Over a week, I have two busy clinic days – one for refractive surgery and one for cornea, as well as three surgical days including anterior segment surgery, cataract and glaucoma, as well as cornea and refractive surgery. Around these, I am busy with COS responsibilities. I also teach a fair bit, and I'm involved in research at my clinic. And somehow, I make sure I exercise regularly!

You've served as a Lions Eye Bank medical co-director – what are your thoughts on the system in Canada?

Canada is an amazing country, but when it comes to corneal transplants and organ donations in general, even developing nations are more functional. We should use the examples from other countries, where corneal tissue is available when needed, rather than waiting for a cornea to become available and treating it like a relative emergency. I think a lot of things need to change, and although some legislative changes have occurred, we really need more education, a shift in the culture, and more financial support. We must better live up to the expectations of the type of country that we are.

What is currently exciting you in the field?

The whole field is exciting, but I would narrow it down to diagnostics and the evolution of surgical techniques. I've found that I'm constantly learning things that weren't even discussed during my training or residency – things like higher-order aberrations or meibography. With surgical techniques the extremes amazes me; we have simple but revolutionary techniques, such as DMEK, which rely on manual dexterity and a fundamental knowledge of biology, all the way to "science fiction" femtosecond lasers that allow us to make micrometer incisions on different layers of the cornea. Surgical transfer courses are highly popular in our COS meetings, and have really evolved over the past 5–10 years to the point where every single year we see the great advances in instrumentation, techniques, and the approaches that can best help our patients. Things are moving so fast and are just so exciting that I'm in awe of everything we can do from a diagnostic and surgical perspective.

In 10 years' time, what do you hope to have achieved?

I think of career evolution in five different stages, and although they might overlap there is progression to them: education, collaboration, building and disseminating our skills, consolidation, and finally, transcending. I think we all leave a mark in the world, so I hope to focus on transcending – whether it is education or administration – or even my own personal family life. I recently completed a physician CEO program at the Kellogg School of Management and I think this will pave the way for the final two stages!

What are your notable career highs?

The day-to-day highs are incredible: removing the patch and seeing the patient smile – or hearing how quickly a technological procedure has changed someone's life. I am grateful and appreciate the career I've had; I think ophthalmology is the best job! I also get a momentary high every time I try a new technique or new procedure...

An incredible career milestone was finishing my residency and becoming certified. Having grown up in Mexico, being certified by the Royal College of Physicians and Surgeons of Canada was unimaginable. A final high was becoming president of COS. Now, I'm in a position to hopefully contribute and give back to the country and community that has allowed me to be where I am today.