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04

THE SIDE SHOW ISSUE

August 2021

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WEIRD SCIENCE

Or at least, a bit different



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"What a long, strange trip it's been..."

Dear Readers,

We're sure when the Grateful Dead wrote those lyrics, they had no idea how "strange" things would get in the year 2020. Not to beat a dead horse, but we're (of course) talking about the COVID-19 pandemic — which has certainly been one of the strangest times most of us have ever experienced.

As I write this letter to you, dear reader, I'm sitting in Las Vegas, Nevada, for the annual meeting of the American Society of Cataract and Refractive Surgeons (ASCRS 2021). And to be frank, it feels pretty odd — it's the first live show I've attended since February 2020, and it's in Las Vegas, which in itself lends itself to the weird. Another oddity? Las Vegas, in general, is packed — it's almost as if the COVID-19 pandemic doesn't exist. Strange times, indeed.

But what does all of this talk of long, strange trips have to do with optometry? Well, here at COOKIE magazine, we get a lot of mileage out of our metaphors — and let's face it, sometimes science can be "weird." From unusual symptoms and rare diseases, doctors can occasionally be presented with a confounding case of the strange. Or perhaps even the science itself can be "odd." We spend a lot of time reading medical journals, and we give credit to the researchers who investigate cases and ideas that most wouldn't even think of. For us at COOKIE magazine, when things get weird, we're likely to get onboard.

So, in this issue, we explore some of these optometric oddities. In our cover story — "Weird Science — Or at Least, a Bit Different" — we dove head first into some of the "stranger" studies out there in the data universe. And what we uncovered is interesting, to say the least. From the importance of hand-eye coordination in Major League Baseball, to the ways in which nutrition and alcohol affect vision, these studies illustrate the creative side of research in eye care and eye health.



Rare diseases are also covered in our "side show" of an infographic — we highly recommend checking out this visually stimulating collection of oddities and rarities in eye disease.

A further topic covered within that could be of particular interest in optometry lies within genetic testing. Could (and should?) optometrists offer these types of tests — which could potentially find a sight-saving diagnosis?

Your trip into "weird science" is just an e-book flip away ... we hope you enjoy this issue! Signing out from the strangeness that is Las Vegas — until next time!

Cheers,

Brooke Herron

Editor

PIE, CAKE & COOKIE magazines



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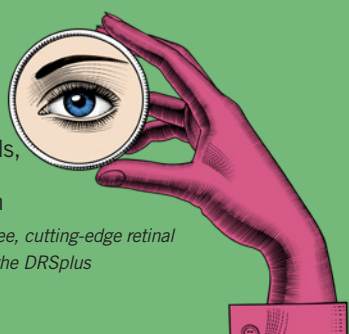
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Dr. Kristie Nguyen
OD

Dr. Kristie Nguyen is a board-certified optometrist. She currently serves as a contract doctor for Perez and Associates and Phan-Tastic Eye Care in Altamonte Springs, Florida, USA.

After graduating in the top 10 of her high school class with honors, she went on to obtain her Bachelor of Science degree from the University of Houston, Texas. While at U of H, she volunteered at a local hospital and worked as an optometric assistant. Dr. Nguyen obtained a Doctorate of Optometry (O.D.) in 2005 from Nova Southeastern University College of Optometry in Fort Lauderdale, Florida. She conducted her medical internships at the Chickasaw Nation Health Clinic in Ardmore, Oklahoma and the Lake Mary Eye Care in Lake Mary, Florida. Dr. Nguyen is a member of the American Optometric Association, the Florida

Optometric Association, Young ODs of America, OD Divas, Optometry Divas and the Central Florida Optometric Society.

In addition, she has been an executive board member for Optometry Divas for the past two years. She is also a brand ambassador for an independent eyewear brand called Kazoku Lunettes and director of business development for an online optical company called Optazoom. She is also an independent consultant for Rodan+Fields, which is a global clinically tested skincare brand.

Dr. Nguyen is married and has two beautiful daughters. She enjoys going to the beach, hanging out at Disney, and reading.

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Dr. Oliver Woo
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Dr. Oliver Woo graduated from the School of Optometry, University of New South Wales, Australia in 1994 and established an independent optometrist practice in Sydney, Australia in 1997. In 2007, he became the first Australian Fellow of the International Academy of Orthokeratology (FIAO) and mentor. Dr. Woo has special interests in pediatric optometry, myopia prevention and control contact lens fitting of orthokeratology and specialty contact lenses.

He opened an Orthokeratology and Myopic Control Clinic in 2010. Dr. Woo uses and provides a variety of methods in myopic management.

Dr. Woo has been actively participating in the continuing education conference of the IAOA (International Academy of Orthokeratology Asian

Branch) as an instructor and mentor for FIAO of Chinese ophthalmologists, as well as in many local and international optometry and ophthalmology conferences as a lecturer and mentor.

He served on the board of directors of the Oceania Society of Orthokeratology (Australia and New Zealand) from 2014 to 2020. He was the FIAO Section Chairman (Oceania — Australia and New Zealand), senior member examination chair and examiner from 2014 to 2017. Dr. Woo actively participates in many local and international optometry and ophthalmology conferences as a lecturer, mentor and coach, with more than 90 international presentations.

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Dr. Carmen Abesamis-Dichoso received her Doctor of Optometry from the Central Colleges of the Philippines in 1989, and earned her Master of Arts in Teaching from the Central Colleges of the Philippines in 2001. Her specialties include special contact lens design for keratoconus, children and high astigmatism; and visual assessment of the mentally challenged, autistic, ADHD, cerebral palsy and learning disabilities. In addition, Dr. Abesamis-Dichoso has been an orthokeratology practitioner in the Philippines since 2005. Since 1998, she has been self-employed in a private practice at Medical Plaza Makati.

She was awarded "Outstanding Optometrist of the Year" in 2017 by the Optometric Association of the Philippines. Currently, Dr. Abesamis-Dichoso serves as the International Affairs Committee chair of the Optometric Association of the Philippines; director of the Special Olympics Opening Eyes in the Philippines; program manager of Optometric Association of the Philippines Vision Screening

Program and provision of eyeglasses with the United Nations Development Program in 10 areas and four Regions in the Philippines; and chairperson of the Special Olympics Healthy Athletes Program in the Philippines.

Dr. Abesamis-Dichoso is a fellow of the American Academy of Optometry; a founding fellow at the Philippine College of Optometrists; a fellow of the International Association of Contact Lens Educators; an Asia-Pacific Regional advisor for the Special Olympics Opening Eyes; treasurer at the Asia-Pacific Council of Optometry; and is an Asia-Pacific Council of Optometry (APCO) representative for the World Council of Optometry, in addition to being a member of the Legislation, Registration and Standards Committee. She has also authored numerous published papers and is a popular lecturer at industry meetings.

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Get outside and play, already!

Myopia in Children

Association of time outdoors and light exposure

by Jillian Webster

Myopia is one of the greatest issues facing the global population. In some regions it is believed that almost 90% of the population will be myopic in the next 30 years.¹ While finding new treatments for this refractive error, doctors are also attempting to find a connection between myopia development and environment. It's theorized that increased light exposure and outdoor time can limit the onset of myopia in children. Thus, as the rate of myopia in the general population increases, environmental factors (e.g., more screen time on smart devices) may be to blame. As such, changes in modern environmental practices may help

lessen, limit — or even prevent — the development of myopia in children.

Using available resources

As the number of individuals with myopia increases yearly, optical specialists are busy assessing different factors in order to understand and counteract the development of myopia. In one case, a study initially done to understand sun exposure on adolescent skin was used to test myopia theory.

This theory on the development of myopia states that increased outdoor time and light exposure will slow or

stop the development and progression of myopia. This idea was explored by Lingham et al.,¹ who determined that “spending less time outdoors during childhood was associated with a higher risk of myopia in young adulthood; and spending less time outdoors during late adolescence and early adulthood was associated with more myopic refractive error in young adulthood and a lower risk of late onset myopia.” By studying the amount of outdoor time experienced by a number of children and then comparing that data to the instances of myopia as this group passed through adolescence, they were able to conclude that there was a connection between light exposure in childhood and myopia.

This study used data initially collected in the Kidskin study, which was a “non-randomized controlled trial that aimed to reduce sun exposure in children through a sun exposure-intervention.



In 1995, the Kidskin Study enrolled 1,776 children attending their first year of school (aged 5–6 years) in the Perth metropolitan region of Australia. The results of this test allowed the researchers insight into the amount of time a large group of children was spending outdoors. Interviewing the subjects years later would provide insights into myopia development using light research studies.¹

With proper consent, Lingham et al., followed up on the Kidskin participants and created the Kidskin Young Adult Myopia Study (KYAMS). “The KYAMS ran from May 2015 to March 2019 and aimed to assess the effect of the Kidskin Study intervention and past time spent outdoors on myopia within the Kidskin Study cohort.” They study had the members of the cohort initially self-report and then they underwent an exam.

They found that, “spending more time outdoors in childhood, adolescence and early adulthood are likely to have long-term, potentially life-long, benefits in preventing myopia,” noting that the study does use self-reporting as a means of data collection, which can lead to recall error. However, the authors are confident that spending more time outside is associated with lower instances of myopia and provides general health benefits.

Time outdoors and myopia

As many people have become acutely aware of during the recent lockdowns due to COVID-19, spending time outdoors has clear health benefits. Spending too much time in front of a screen can be at minimum tiring for the eye, if not related to other conditions, especially in the developing eye. One study reports² that “it is well known that the various ocular components undergo growth and maturation in younger children, and thus, the ocular growth patterns may be more sensitive to environmental influences including outdoor time during this period.”

Children aged 11-12 spend most of their time in school. Because of this, many school districts have made attempts to increase light exposure in students. This is a trend that has some significant documentation from Asian countries. Dr. Bruce Lan, a professor of ophthalmology at Aier Eye Hospital Group Guangzhou, Guangdong, China, has done an extensive study of the correlation between myopia and outdoor time among school children in China.

During the Singapore Optometric Association-Asia Optometric Congress (SOA-AOC) e-symposium 2021, Dr. Lan discussed the data he collected regarding students in rural, suburban

and urban environments in China. He says that lifestyle is also a major player in the development of myopia. Students who learned in rural environments had higher light exposure and lower instances of myopia compared to students who learned in an urban environment. He has created a “visual behavior index” which in the future will be a better way to measure the effects of light exposure on myopia through data collection.

Where do we go from here?

It's important to consider that though there is evidence to suggest that outdoor time and light exposure is associated with lower instances of myopia, it's still not a treatment for the condition. In the review from Xiong et al., they state that “the dose-response analysis indicated that while an increase in the time spent outdoors could result in greater protection against myopia onset, it did not result in slowing the progression of myopia in eyes that were already myopic.” There seems to be a trend: Children who spend more time outside during crucial stages of development tend to have less instances of myopia. However, there is no clear data that shows increased time outside can treat myopia. Therefore myopia is still a great health risk.

As optometrists go into the future with myopia development research, they must consider the optimal conditions regarding progression of refractive error and its correction. More research needs to be done as to the correlation with the development of myopia and outdoor time, as well as the relation, if any, to increased light exposure and the limiting of myopic progression. 🍷

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Studies show less time outdoors plus more screen time is leading to increasing incidences of myopia in children.



Gene Therapy and Testing Could Play a Major Role in Optometry

by Andrew Sweeney

I don't know about you, but by 2021 I always hoped that the scientific community could have made some seriously cool progress with gene therapy ... you know, really unlock the gene pool sci-fi style. I'm talking about the ability to shoot laser beams from my eyes, or change my appearance like a chameleon, or even disappear entirely. Needless to say, we haven't quite reached the lofty ambitions of my childhood dreams.

But just because the very laws of nature and physics are not being violated to adhere to a young child's fantasy doesn't mean that gene therapy isn't cool. In fact, this science is behind some absolutely fantastic developments in many aspects of medicine. Human gene therapy is being used to treat a wide range of diseases including cystic fibrosis, adenosine deaminase deficiency, familial hypercholesterolemia, cancer and more. More specifically, gene therapy is beginning to be applied in ophthalmology too, for conditions

ranging from age-related macular degeneration to Leber's congenital amaurosis.

You could have a gene that causes blindness

For all the uses of gene therapy, the most interesting generally — and for optometry, specifically — is in its potential for treating inherited retinal diseases (IRDs). Also known as monogenic retinal diseases, IRDs are a major cause of blindness in the pediatric and working-age population in many countries, and pathogenic variants in more than 250 genes can cause various forms of IRDs. For most of these diseases, no medical or surgical treatments currently exist, but this may change as a number of therapeutic trials are underway.¹



There are many different IRDs that clinicians should be aware of, however a specific few are encountered more commonly. These include retinitis pigmentosa (a group of related eye disorders caused by variations in 60 different genes); choroideremia (which causes progressive vision loss and is usually associated with night blindness); and Stargardt macular dystrophy, (which causes damage to the macula). These and the other IRDs may be relatively rare, but they significantly impact patient's quality of life and usually cause a gradual loss of vision or even total blindness.

Gene therapy may seem like the cutting-edge of science fiction to some, but the technology is actually relatively simple when broken down into its key components. The technique usually involves one of two related concepts: Firstly, a faulty or inactive gene that can cause diseases is replaced before it can cause the patient harm. Secondly, an entirely new gene can be introduced to the patient. Regardless if it's a replacement or entirely new, any gene that is entered into a patient's body is delivered by a vector, usually a modified and harmless virus, which itself is delivered by either an injection or an intravenous drip.²

Now you may be saying to yourself that this is all very interesting, and certainly, injecting a gene via a specially modified virus is pretty cool — but what does this have to do with optometry? Even if gene therapy can be used to treat IRDs and other eye diseases, surely this has more to do with ophthalmology? Well, hold on to your outrage tweets as there is a growing body of research that points to the important role optometry could play in this field.

Should optometrists start taking blood samples?

If optometrists could expand their patient offerings to include genetic testing, for example, by collecting blood or saliva samples from their clients, they would be well placed to act on the front line of screening for IRDs. Working on creating a system like this is already underway "Down Under," and research has emerged highlighting the role optometrists can play. *An Optometrist's Guide to the Top Candidate Inherited Retinal Diseases for Gene Therapy* is one such study, which examines a number of gene therapy trials and their applicability to IRDs.

The study points out that "optometrists are well placed to help establish a clinical profile, determine the level of visual function, monitor disease progression, and work as part of a multidisciplinary team in establishing a genetic diagnosis." Pointing out that if suspected in younger, working-age adults with visual field loss and abnormal photoreceptor function, the study highlights how optometrists can act as the first line of defense in IRD treatment. This is by quickly identifying these young patients who might not be aware of their risky genetic profile. The study recommends that visual acuity be closely monitored: In potential IRD patients, it can range from 6/5 to no light perception, with approximately 10% of individuals with an IRD having visual acuity less than 6/60.³



It might be difficult for some optometrist to persuade their clients that adding saliva and/or blood testing to their usual check-up is a good idea, but the patients (especially younger ones) really stand to benefit. It will be for clinicians to persuade their charges, as well as to set up the infrastructure required for facilitating this change. However, they should do this as genetic testing, leading to timely gene therapy, could certainly save the sight of many. 🧐

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Online or Off

Where are consumers purchasing spectacles?

by Jillian Webster

Thanks to the pandemic, as well as the general popularity of online shopping, more and more people are making their purchases online. But what about those needing prescription eyeglasses — is online or in-store better ... or preferred?

Many factors contribute to a consumer's decision on where they purchase items. But for spectacle-wearers, the main factors that they consider before making a purchase are vision, convenience, style and cost. Buying spectacles in-store assures the purchaser of the appearance of the glasses and the accuracy of vision correction; however, there are other requirements that online shopping meets. Often, the intimacy of the in-store optometric experience is traded for the convenience and cost-effectiveness of the online store.

There has been an expansion in consumer options since the dawn of online shopping. The internet offers convenience but the online interface requires a depth of knowledge of optical faculties that the average person is unaware of — whereas the in-store experience offers professional expertise. The margin of error is less in-store, which is especially important for patients with complicated optical issues. Purchasing in-store also allows the consumer to know exactly what they are buying. While there are many features that allow you to preview glasses with online retailers, there is no certainty that the product ordered will be the product received. Clearly, each option has its benefits and detriments.

The customer experience

There are a number of things that patients consider when buying

spectacles — but vision is only one of them. Cost, appearance, comfort and convenience are also large factors. Together, these conditions outweigh the importance of vision correction in choosing lenses. If vision correction was the only factor in choosing eyeglasses, then everyone with a refractory condition would walk around wearing the same ones ... and we would not have many of the glorious innovations in eyewear enjoyed today.

In countries with comparatively high median incomes, most spectacles are bought in-person at optometry and optical practices. Some chose their corner optometrist, while others chose to go to big department stores for their glasses. In these locations, spectacles are made to the specifications of each individual. A customer going in-person

to an optometrist's office can be assured that the measurements will be done accurately and with the proper equipment set to certain international standards. If there is an issue, there is also a precise location to address that issue in a timely manner. However, a trip to the office might not always fit into a patient's busy schedule.

Online shopping is a quick way to fit shopping into daily life. There has been an increase in the amount of lenses being purchased online in recent years. "Spectacles are now increasingly sold online, with approximately 6% of all prescription spectacles in the U.K. purchased via the Internet in 2015," noted a report from 2016.¹ Since then online shopping has only become easier and more convenient.

Online shopping fits the increasingly busy and interconnected lifestyles





of people in developed countries. As more and more services are catering to online shopping, it feels natural to forgo in-person interaction with an optometrist for the satisfaction of online purchasing. Assuming the patient understands their prescription and eye measurements, online stores can meet most if not all of the consumers' needs.

Getting the right fit

Though there are a number of other significant factors that are taken into consideration when purchasing spectacles, quality is especially important and all patients need to have accurate refractory correction. Patients that require bifocals and progressive addition lenses (PALs) are at a greater risk of accident if the quality of their lenses cannot be assured.

In fact, "an assessment of the quality of online spectacles in comparison with those dispensed in optometry practice is important, given the likely increase in this purchase method and the possible adverse effects on patients if the spectacles are not supplied correctly. This would seem to be particularly important for the provision of bifocals and PALs, which can increase the risk of accidents and falls in elderly patients.¹" These patients must be able to trust the source of their lenses.

All things considered, optometrists need to understand the needs of patients to promote in-store visits. One advantage of the in-person optometric experience is that the individual can enjoy the experience with advice that is personally relevant to their situation. This increases customer satisfaction and encourages patients to choose in-store appointments over online shopping.²

Do the right thing

To improve the customer experience, optometrist and online platforms should cater the experience to the individual's needs. One report² found that "research in the U.K. has indicated that clients report that they do not receive sufficient information about their eyecare, or about the different options that are available to them." Thus, to maintain

a preference for in-store optometric visits, the experience should be catered not only to the needs of the individual, but also to consumer education. Most people enjoy the imparted wisdom from a professional — especially if it pertains to their particular situation. If the experience does not have a personal touch, then the patient could perceive an online experience as being comparable.

Whether online or in-person, consumers are looking for convenience, style, cost and a positive overall experience. Some find an online store to be confusing, while an in-store can also be similarly impersonal. In their report,¹ Alderson et al., found that, "participants preferred in-practice spectacles, ranking them higher on average than those bought online ... and stated that they would

purchase their next pair of spectacles from optometry/optician practices." The trust fostered by an in-person visit to an optometrist can not go unmentioned. Of all the factors, trust in the products and trust in the experience are most important. As the world of online shopping becomes more prevalent it is important to maintain the relationship patients have with their doctors, while receiving care. 🍷

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Purchasing eyeglasses online can be difficult for some consumers to master.



An Ortho-K Lens Specialized for Asian Eyes

by Elisa DeMartino



Today it's possible to tailor any products to peoples' specific needs, and contact lenses are not being overlooked. During the 2021 SOA-AOC e-Symposium Dr. Ngoc Hoang demonstrated a special orthokeratology lens (or Ortho-K) and shared results of recent studies regarding its effectiveness.

With a PhD in biotechnology from the Tokyo Institute of Technology, Dr. Hoang is currently involved in the Clinical Affairs Department at Japanese vision company SEED, where she helps facilitate clinical trials of their lenses in Japan and abroad. She has brought experience in evaluating several types of contact lenses from SEED and other manufacturers.

Let's have a glance at how SEED's overnight corneal shaping lens is particularly suitable for East Asian eyes, in particular.

The rise of myopia in Asia

Dr. Hoang reports that in 2010 about 25% of the global population had a form of myopia. With numbers increasing by 5% each decade, by 2050 half of the world is expected to be near-sighted.

Yet in Asia, the numbers are more extreme, with studies showing East Asians being more susceptible to the epidemic. In Singapore, the prevalence of myopia is among the highest in the world, with 65% of children being myopic by 6-years-old; and by 2050 it's predicted that 80-90% of all Singaporean adults will have some form of the disease.

More alarmingly, the COVID-19 pandemic appears to have had an effect on myopia development, most notably in young children who have been forced to have more screen time per day

and who are no longer spending time outside walking to and from school. Citing a 2019-2020 study from China, the biotechnology expert explained that due to children staying home for school, the rate of refractive error of children aged 6,7 and 8-years-old was significantly worse and the number of myopic children increased 3x, 2x and 1.4x respectively.

"The reason why myopia is a major public health concern," Dr. Hoang warns, "is because myopia is not just a refractive error ... there are some side threatening complications such as cataract, retinal detachment and myopic maculopathy."

Fortunately, the use of Ortho-K lenses prevents myopia and can help prevent its associated health risks by reshaping the cornea; it's particularly effective for children who do not yet have high myopia.



Curvature matters

Orthokeratology lenses aren't brand new. Still, their use hasn't really permeated society: "There's evidence that Ortho-K prescription is increasing in several countries but the percentage is still relatively low," Dr. Hoang reported. "Countries like Taiwan, China, Malaysia and Japan have maybe 2-3%."

At the same time, more and more Japanese clinics are prescribing Ortho-K, with the number more than doubling between 2013 and 2019. About 75% of the patients are children under 18-years-old. Citing a SEED study with clinician respondents, providers believe Ortho-K has a good myopia control effect, and about 27% of respondents say they began to offer such lenses because patients came in asking for them.

With the goal to provide an ideal option for those considering a nighttime lens, SEED has taken into account that Asian eyes are shallower and flatter than Caucasian eyes, which might affect lens fit.

"The normal lens was designed originally for Caucasian eyes," Dr. Hoang explained. "There is a need for an Ortho-K specifically designed for Asians ... a shallower lens with a wider treatment zone which may bring more clarity for the Asian patient."

Battling dry-eye

Dry eye is a common symptom of wearing contact lenses, and studies have shown that Asians may have more susceptibility.¹

The SEED Ortho-K lens design presented by Dr. Hoang boasts a new material make up that gives it oxygen permeability that is "significantly higher than other Ortho-K lenses available on the market."

Without enough oxygen, our eyes struggle to produce natural tears. What's more, low oxygen leads to hypoxia which leads to corneal edema. These are frustrating experiences that could lead a patient to give up on Ortho-K treatment.

"Our material has silicone embedded in strong methyl methacrylate (MMA) molecules, so it maximizes the oxygen transmission while keeping the material high durability," elaborated the expert.

Citing a 1984 study,² she elaborated that minimum Dk/t (ionicity and oxygen transmission) to ensure sufficient oxygen to prevent corneal edema is 75, and confidently announced that only SEED's lens satisfies this criteria.

The composition of the lens also makes it more durable: While it's likely none of us have or are planning to ever purposely smash something heavy on top of our contact lenses, such a test that was carried out on multiple lenses revealed that SEED's Ortho-K variant was broken with a ball dropped from 150cm while other lenses were destroyed from only 20-30cm.

"This flexibility gives you confidence while washing and handling the lens; also, it provides the safety of lens wear. I have heard of other Ortho-K lenses breaking inside of patients' eyes while they were sleeping; this never happens to our lens. When the lens is broken they have to wait 2-3 weeks while the lens arrives, so their vision gradually goes down and when the new lens comes it goes up again. This affects the quality of life of your patient during that period."

Keeping near-sightedness far away

Studies carried out by SEED demonstrate that wearing orthokeratology lenses results in a good improvement of refractive error, stable flattening of the cornea, and low to zero occurrence of incidents. At the 12th week of lens wear, 90% of patients have excellent visual acuity of more than a 1 decimal increase.

"Our Ortho-K lens provides several benefits to patients and practitioners because it is highly suitable for Asian eyes, with high Dk and high Dk/t, providing sufficient oxygen to the cornea. [The lens] is also highly flexible and durable, ensuring [it] won't break easily," Dr. Hoang summarized.

These orthokeratology lenses have proven their ability to stave off myopia and improve visual acuity to near-perfect in most patients, making them an "eye-deal" option for near-sighted Asians. 🍷

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Improving vision while sleeping ... sounds like a win-win.



WEIRD SCIENCE

Or at least, a bit different

by Sam McCommon



Generally, medical studies are seen and understood as very serious business. And indeed, they usually are, and for good reason — the information they provide is always somewhere on the useful spectrum, even if it's a study that simply shows we don't know enough about a subject.

We applaud those who work on medical studies, because they're hard work. The rigor and methodology that go into them is no joke, and in many cases they literally save lives.

If you're waiting for a "but," well, here it is. We love medical studies — but, we also love it when they focus on subjects that are a bit out of the norm, or show some creative flair, or when we get the impression the authors are thinking outside of the box. Additionally, we like studies that light up our own imaginations ... because nobody wants to drown themselves in a lukewarm bathtub of staid statistics all day, every day.

So, we've wrangled together a few of our favorite studies in the world of eye health that can be enlightening in their own right — and also add a bit of levity to a subject that's usually pretty gravity-forward.

Come along with us on a trip through a little bit of the different side of optometric studies. Or, at least, as different as the field and proper medical practice will allow.

Batter up! Hand-eye

coordination in professional baseball players

You might not be surprised to hear that professional athletes of any variety generally have excellent vision. You might also not be surprised to hear that there's a whole lot of money in baseball science — Major League Baseball (MLB) is a multi-billion dollar business, after all.

But what may surprise you is just how good professional baseball players' vision is — and how their visuomotor

skill, including eye-hand visual-motor reaction time (EH-VRMT) is absolutely crucial for their performance.

A 2018 study¹ published in *Optometry and Vision Science* set out to determine just how EH-VRMT affected a baseball player's performance. Most specifically, it helped determine a batter's plate discipline. For the uninitiated, that means the ability to determine between a good and a bad pitch at incredibly fast speeds.

We mentioned surprises just a moment ago. It may surprise some readers that, of all athletes studied, baseball players overall have the best visuomotor skill. Older studies back this up — a 1996 study showed that the average professional player had a visual acuity of 20/12.^{2,3}

In case you're not as much of a baseball fan (as this writer clearly is), let's put things into context here. Hitting a 95 mph fastball (~150 kph) is really, really hard. If you've never seen one in person, it's difficult to put it in context, but here's an attempt. It'll take that ball less than half a second — 0.425 seconds, just to be specific — to reach the plate. That may give some indication as to why visuomotor skills are just so important to baseball, and batting is just one aspect of the sport.

Indeed, the results of the 2018 study¹ show that players with a better EH-VRMT had longer major league careers and had higher levels of play — meaning, essentially, they were better and more successful at the sport. And that's no accident.

As the authors noted, "Although the correlations are considered small to moderate in size, likely due to the many factors that are necessary for successful batting in baseball, they are highly unlikely to be due to chance, indicating that eye-hand visual-motor reaction time likely accounts for a portion of the variability in plate discipline."

Now, if you're reading this, you're likely not a professional athlete, nor are you likely involved in the non-recreational side of athletics. But there is a neat takeaway to be had here, and it's this: A person can improve their eye-hand

reaction time with training. That may sound intuitive, but it's always good to have evidence to back up intuition. If we relied solely on intuition, we'd still think the sun went around the Earth.

Essentially, studies have shown that reaction time in both peripheral and central vision fields can be brought down with practice. The results of the studies are clear: Eye-hand reaction time can be reduced, the training transfers to other retinal loci, and the improvement is retained following the training for at least up to three weeks.^{4,5}

So, if you've got a patient who struggles with coordination or is trying to rehabilitate from any number of vision-reducing problems: Eye-hand coordination training actually works. And hey, if there's any specific skill we need as a species, eye-hand coordination is pretty high on the list.

Nutrition and vision:

Is the picture clear yet?

An eye health story from 2019 caught the eye of more than just eye doctors — it was picked up by a number of popular publications, including the *New York Post*. The story was this: A young boy in the U.K. went blind from his poor diet. This led to a diagnosis of nutritional optic neuropathy, which is essentially nerve damage caused by lousy eating.⁶

Now, this boy was a particularly egregious case, as he refused to eat essentially anything that resembled healthy food due to extreme pickiness. This resulted in vitamin B12 deficiency, low copper and selenium levels, a high zinc level, and significantly low vitamin D and bone density levels.

Usually, nutritional optic neuropathy is related to bowel problems or drugs that prevent adequate absorption of vitamins, as well as situational nutritional deficiency. So, because this case took place in a developed country, doctors didn't catch the root cause until it was too late. Going blind from nutritional causes is usually relegated to regions experiencing war, famine or other catastrophes.



A cocktail or three may keep the blues away, but cataracts may come a-knocking.

you intend to separate someone from 12-25-years-old from their screens? Best of luck to you if that's your goal. Studies may demonstrate that a crowbar is insufficient.

Of cocktails and cataracts

We know that age-related cataracts are the leading cause of visual impairment everywhere in the world. With aging populations in many countries, their impact and quality of life effects will be more widely felt than ever.

But identifying just what causes age-related cataracts is a tricky business, because cataracts, like people, can be quite different from case to case.

Alcohol is a commonly identified culprit in many chronic diseases — so why not in cataracts, too? Until just recently, the link between alcohol and cataracts was poorly understood, but a meta-analysis gives us a better grasp of the situation.⁹

Actually, this wasn't just one meta-analysis, but separate meta-analyses that explored the relationship between heavy or moderate alcohol use and age-

However, the case led many to question the role of nutrition in eyesight, which is often hard to nail down because it's such a multifactorial issue. We know, for example, that early-life administration of vitamin A can prevent blindness in poverty-stricken regions⁷ — but what about all the other stuff? And what about less drastic cases than blindness?

For example: Is diet related in any way to myopia?

Just for some background, consider this: Myopia is significantly more prevalent worldwide than it used to be, and its growth has been too fast to be simply genetically based. There's some sort of external factor leading to it, but we're not quite sure what it is yet. Many would blame environmental factors such as screen time, but the relationship between myopia and diet wasn't really explored until just recently.

Naturally, a study⁸ followed up on this question — and it was no guppy of a

study, either. In this case, data from a total of 6,855 ethnically diverse Americans from 12-25 years old were analyzed.

The results were resoundingly, well ... unresounding. Body metrics like body mass index or nutritional factors, including serum vitamin D, glucose levels or caffeine intake were shown to have essentially no correlation with an increased incidence of myopia.

However, higher insulin levels were correlated to higher odds of having myopia. So there's that, at least.

Instead of diet, the authors pointed to environmental factors like those in the visual field — i.e., those pesky screens everywhere — as the likely main culprit behind myopia. And, yes, there are plenty of studies on that topic, but that's outside the scope of this article, thank goodness. We all know just what a can of worms that is to open. After all, how do





related cataract development.

Just to make sure we're all using the same terminology, heavy alcohol consumption meant more than two standard drinks per day, equivalent to a daily intake of 20g of alcohol per day or 140g per week. Moderate alcohol consumption, on the other hand, meant less than 20g of alcohol per day but more than none. If you think that's a pretty broad description, well, you're right — as anything north of 20g per day could be anything at all. Additionally, less than 20g per day didn't even mean every day, as it simply meant not total abstinence.

No matter — these meta-analyses are what they are, and we appreciate their existence. They also confirm theories coming out of many other areas of medicine that suggest that moderate alcohol consumption can either be neutral or beneficial to health, while heavy alcohol consumption is deleterious to all sorts of body parts.

These meta analyses indeed suggested that there was a “marginally non-significant” association between moderate alcohol use and age-related

cataract. On the other hand, there was a notable association of heavy alcohol use and age-related cataract.

Of interesting note is that the pooled studies — five case-controlled studies and five cohort studies — covered multiple countries and continents, including the United States, Australia, Sweden, Nigeria, India, Scotland and Italy. So, that's a pretty darn broad list of countries and genetic differences to cover, if not all-encompassing.

The main takeaway is that all studies reported associations between heavy alcohol consumption and cataract development.

In case you wondered if smoking was a potential contaminant to the data as well as the air, smoking was adjusted in six of the 10 studies. Indeed, smoking is related to cataracts, and the authors of the study were well aware of the link.

The authors' conclusions make for some valuable takeaways for eye specialists. Notably, they suggest that information on a patient's drinking history would be of value to eye specialists, especially when there's a diagnosis of cataract. Both general practitioners and eye specialists should keep note of their patients' drinking habits and the information should be collected on a routine basis to get ahead of the curve and screen any potential cataract cases before things get out of hand.

Keep 'em coming!

As people who have to regularly read medical studies, the ones that pop off the page are the ones that would raise an eyebrow in even lay readers. We think the three above do just that, and may even make for decent click-baitiness if used correctly. After all, eyeballs is what this is all about — both making sure they're working correctly, and getting enough of them on a page to share information.

If you have interesting studies or other eye-opening (that joke never gets old) information for us, we'd love to hear from you! You may even appear in the next edition of *COOKIE* magazine. Wouldn't that be a treat? 🍪

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Next on the Side Show Stage

RARE OCULAR DISEASES

As the name suggests, rare diseases are uncommon

— but that doesn't mean they're not encountered.

According to a 2019 study¹:

$\frac{1}{10}$

people are affected
by rare diseases

$\frac{1}{2}$

patients diagnosed
with a rare disease is
a child

$\frac{8}{10}$

rare diseases are caused
by a faulty gene

8 YRS

is the average time it takes for
rare disease patients to receive an
accurate diagnosis

350M

people suffer from a rare
disease globally

95%

of the rare diseases lack an FDA
approved treatment



In the United States, a disease is considered “rare” if it affects less than 200,000 people.

Here are some of the less common pathologies treated by ophthalmologists.²

Hemolacria (bloody tears)

Tears tinged with blood usually signal another underlying problem.

Extremely

RARE

Retinitis Pigmentosa

There's no cure, but promising treatments like bionic eyes are in development.

25 in
100,000

Stargardt Disease

Stargardt disease can go undetected until adolescence or adulthood, when blurry or distorted vision develops.

12 in
100,000

Best Disease

There's not yet a treatment, but gene therapies and stem cell therapies may alleviate or cure this condition in the future.

6 in
100,000

Batten Disease

There are different forms of the disease, but all are fatal — doctors are still working on a treatment

4 in
100,000

Bietti's Crystalline Dystrophy

People of Asian descent are most likely to develop this condition. There is not yet a cure or treatment

1.5 in
100,000

Axenfeld-Rieger Syndrome

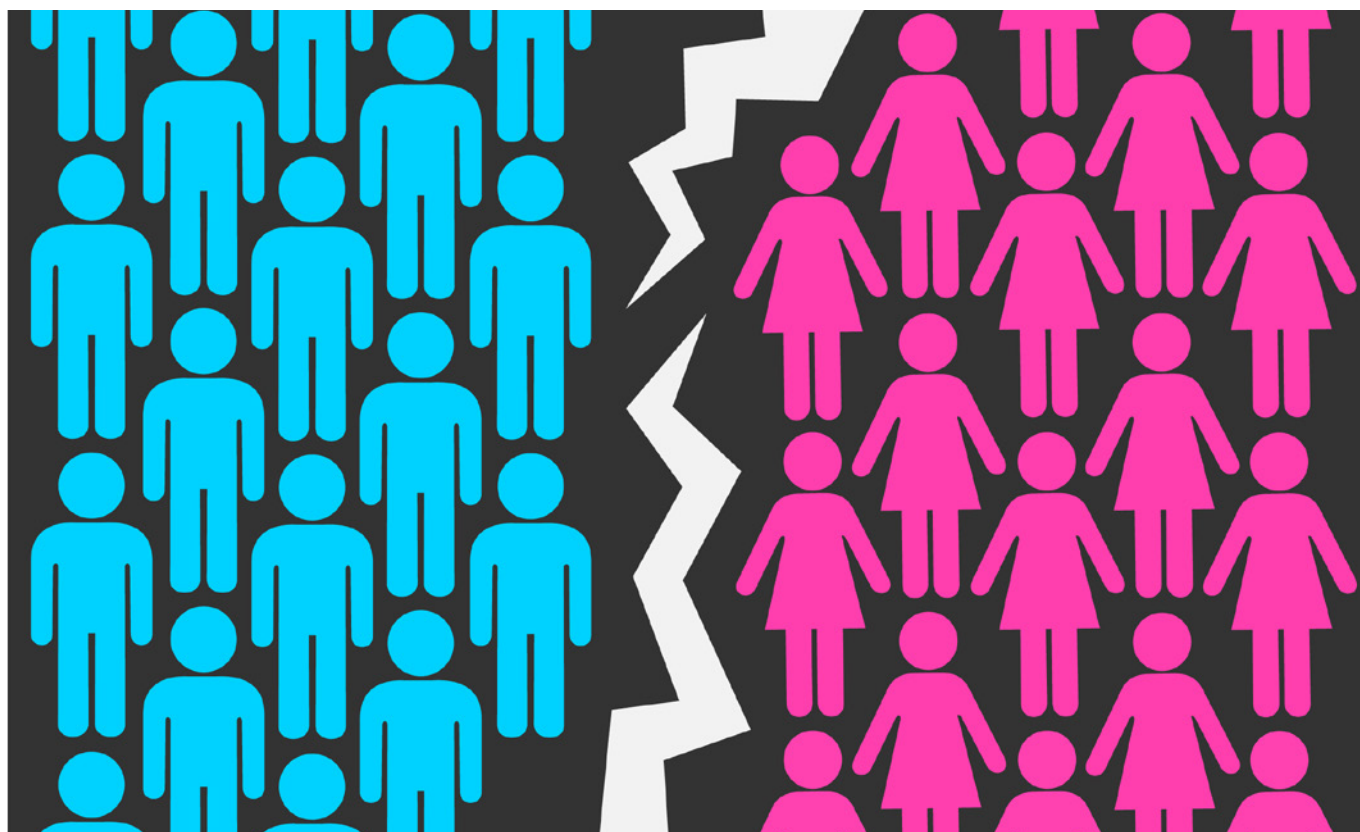
This syndrome causes various eye problems including a thin iris and an off-center pupil — and in some cases, extra holes in the iris can give the appearance of multiple pupils. In other cases, the cornea is affected.

< 1 in
100,000



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Enough is Enough

On gender inequities in visual health and the workplace *by Chris Higginson*

Overall, women are 12% more likely to have vision loss than men — and there is no simple, single reason for this, rather it stems from multiple different causes.

This was reported during a Cybersight webinar: Women Leaders in Eye Health. The webinar examined global gender inequities in visual health and blindness, as well as the impact of gender bias in the workplace. The panel was led by Dr. Lucia Silva (Guatemala), Dr. Angela Fernandez (Colombia), Dr. Keith Carter (USA) and Prof. Dr. Ciku Mathenge (Rwanda).

An unfortunate truth

It's unfortunate (but true) that more often, women suffer from diseases that cause blindness than men. Sometimes

this is due to cultural gender roles, like women's responsibility in childcare, which results in women being more likely to contract disease from children. Poor eye health can also be due to biological and hormonal factors, sometimes linked to pregnancy or menopause. A further factor is that life expectancy, all over the world, is higher for women than for men — diseases such as cataract, glaucoma and presbyopia all increase in likelihood with age.

Potentially the largest issue is getting women access to available services. Women are less likely to be prioritized by the community, resulting in a fear of the unknown and a feeling they are not worthy of treatment. Older women (especially) are the most likely to suffer from blindness — but are also often the least prioritized members of

the community. This means they are forced to suffer poor visual health, even if treatment is available. In many countries, women have only limited influence over decision making, both at a community and national level, meaning their needs are not prioritized. Women are less likely to be able to travel independently than men, sometimes because they require an escort to move around outside the home or potentially because they need to organize alternative childcare.

Women are less likely to be literate and educated enough to understand what is happening and to know that their illness can be treated — the highest levels of blindness are found in the areas with the highest levels of illiteracy. Finally, there is the issue of financial independence — women are less likely to have access to their own finances



and are less likely to have their health prioritized if a family or community is poor.

Second generation gender bias

The second generation gender bias is at the root of a lot of current disparities, remarked Dr. Rosa Balcells (Chile) during a discussion on gender inequalities in the workplace. This bias applies to practices that appear neutral initially, but then still discriminate against a particular gender to reflect the values of the gender that created the setting. This is in contrast to first generation bias, which is deliberate and intentionally excludes women.

The second generation gender bias is at the root of a lot of current disparities.

A study* published in the United Kingdom interviewed a variety of medical students to find out what their perceptions of femininity were in the workplace. It found three areas that need to be addressed. Firstly, there is a cultural bias that sees femininity as a form of weakness and automatically questions a woman's competence and

commitment following motherhood, as well as women's physical strength and intelligence. Secondly, there is the organizational culture that assumes all doctors are men and all nurses are female, restricting career opportunities for women. These factors result in women having less access to leadership positions, fewer podium opportunities, lack of work recognition and a pay gap between their male colleagues.

Dr. Nancy Al Raqqad (Jordan) shared that women are forced to perform to exactly the same standards and capabilities as men — even when those exact standards are not necessary for the job, but are in place simply because of the numerical superiority of men. Although there is already a bias within the workplace, Dr. Al Raqqad believes the COVID-era will make things worse — when schools close and there is a lack of childcare and social support, pressure will start to rise and women will be expected to withdraw from work and return to the home.

Dr. Al Raqqad believes the problem stems from two different places. Some issues arise from women: She believes some women suffer from imposters' syndrome ... further, there is a lack of mentoring and support and, most importantly, women accept the way things are. Also, there are men, work and community related issues, as well as current preconceptions. The issue

is that many women accept them, plus mens' fear that if more women compete, then they may outperform them. There is also a culture of bullying and intimidation to keep women in the household and out the workplace.

The current situation

Dr. Julia Haller (USA) shared how things are at the moment for women in medicine. Women have improved in salary negotiation — which previously has been seen as part of the reason for the pay gap — but the women who are getting better salaries are now being labeled as bullies or pushy. Sadly, a huge number of female doctors are suffering from sexual harassment in the workplace, with up to 75% saying they have been sexually harassed at work — this is something that needs to change.

Women also tend to gravitate towards academia. However, the vast majority of women faculty are either at the instructor or assistant professor level, with only 25% of full professors being women. In terms of paper authorship, things are improving, but there is still a marked shortfall in the number of women in the first and last authorship positions, with all journals reporting a lower number of female authors.

To improve the situation, Dr. Haller believes women should work on their knowledge, skills and expectations; improve mentorship and guidance; network; pursue leadership training and carve out leadership roles in whatever area of influence they find themselves in. 🌱

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Editor's Note:

The Cybersight webinar series on Women Leaders in Eye Health was held on May 8 and May 22. Reporting for this story took place during the event.



A Tribute to **Dr. Anna Estelle Glancy**

One of the 20th century's most
influential lens designers *by Chris Higginson*



It's taken more than half a century, but the contributions from Dr. Anna Estelle Glancy are finally getting the attention they deserve. Her pioneering inventions of progressive lenses, the lensometer, as well as her 31-year career as a woman in a then male-dominated field, are being properly acknowledged.

The early 20th century was a difficult and confusing time to be an intelligent young woman. By the roaring 1920s, American women had been given the right to vote, the first woman had been elected to Congress, and the first wave of women were graduating from universities with undergraduate and graduate degrees (as well as MDs and PhDs). However, old prejudices die hard and women such as Dr. Glancy found,

again and again, that just because the legislation had been removed that barred their advancement, receiving the recognition and rewards they deserved would still be difficult.

A woman before her time

Although she went on to become one of the most successful lens designers of the 20th century, Dr. Glancy earned her PhD from the University of California at Berkeley in 1913 — not in medicine or ophthalmology — but in astronomy.¹ Finding that her ample qualifications were not enough to overcome the prejudices of American employers, she moved to Argentina to take a job at the National Observatory there. After five years in South America, she returned

home complaining that even though she had been given the initial role, men without her training and credentials were given promotions and jobs she was denied. Despairing of ever using her scientific talents, she considered giving up on science and taking a job in an airplane factory.

Fortunately for us all, Dr. Glancy was able to secure a job with Dr. Edgar Tillyer at American Optical (now part of ZEISS Vision Care), thanks to her mathematical expertise and experience with astronomical lenses. She stayed at American Optical for the next 31 years, working as the only female lens designer in the world.²

When considering her career change, Dr. Glancy said, "I had no illusions



about the difficulty of transferring from astronomy to optics, but I also knew that there was no better background than computing in astronomical problems.³

Starting in 1918, Dr. Glancy spent her first 10 years completing the 13 hand-calculated volumes of painstaking ophthalmic design and ray-tracing calculations required for the development of what would become known as the Tillyer Ophthalmic Lens (which arguably, should be known as the Tillyer-Glancy lens).⁴ Until that time, lenses had a tendency to be accurate in the center, but became distorted toward the edges. Due to Glancy's calculations, the Tillyer lenses were the first to maintain accuracy all the way to the edge, making them one of the 20th century's biggest lens advancements and the industry standard from then on.

Whereas Dr. Tillyer (whose doctorate was honorary and not formally earned) would go on to become well known and respected for his work in lens design, Dr. Glancy's contributions were barely mentioned. Even though she patented both progressive lenses and the lensometer — making her one of the most important lens designers of the 20th century — Dr. Glancy is hardly ever acknowledged publicly.

Fortunately, the few articles that do mention her never fail to be impressive. One of the very few written during her career stated that, “out of the 5,000 employees at the American Optical Company, probably not more than six understand what she does,” yet millions of people have benefited from her work and continue to do so.⁴

Her achievements can hardly be overstated: In her 31-year career Dr. Glancy would go on to get 13 patents and push the boundaries of what lenses were able to do.⁵ In 1929, she received a patent for a “lens testing instrument,” the first incarnation of the lensometer, used by ophthalmologists all over the world to this day. In 1923, she was granted a patent for the first ever progressive lens — arguably one of the biggest advances in lens manufacturing in the first half of the 20th century — and half a century before they would become a widely used alternative for bifocals and trifocals. In the 1930s, she completed more than 200 pages of painstakingly handwritten calculations to develop a breakthrough camera lens that helped photographers take sharper pictures.

In the 1930s she also turned her attention to pilot's goggles, which were causing severe headaches because of the way they wrapped around the head.

Dr. Glancy concluded the headaches were due to distortions caused by prismatic imbalance errors and her updated calculations were incorporated into the next generation of American Optical's flying goggles.⁴

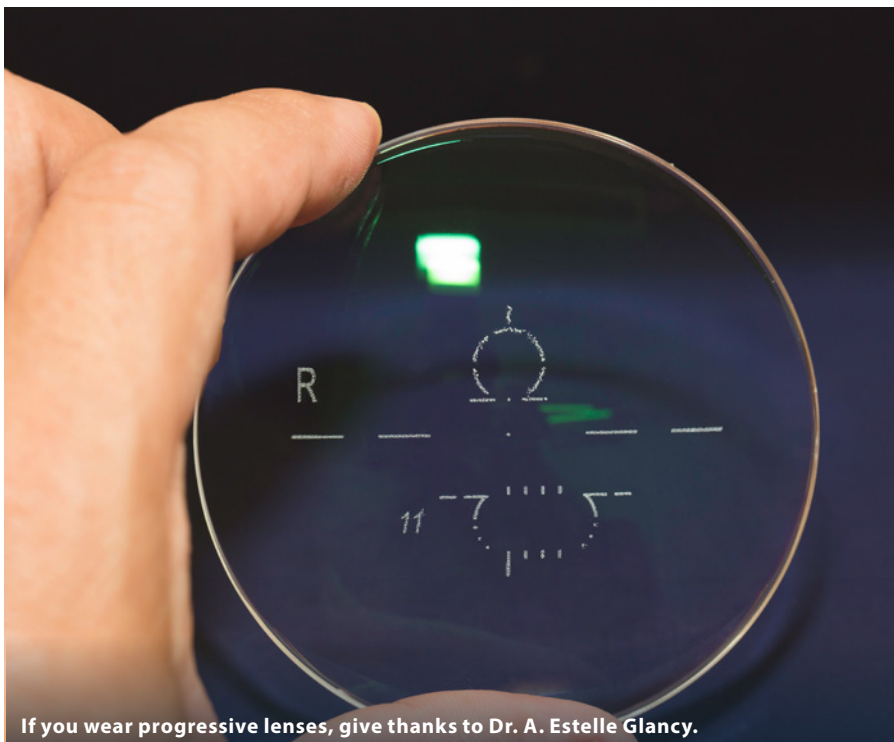
As well as producing her own work, her calculations also acted as a catalyst for others: helping further advances in telescopes, eye exam equipment and military optics. When larger televisions were being developed, experts drew on her research and calculations to create bigger, sharper screens.⁶

The 20th century was full of women who chased opportunities of equality that had been promised — but whose contributions have gone nearly unnoticed until recently. Although Dr. Glancy never worked there herself, NASA, in particular, was full of women whose contributions made the Apollo missions possible, but those efforts have only been acknowledged in the past few years. Dr. Glancy, with an entire career as the sole woman in her field, as well as patenting inventions that are still influential to this day, seems particularly deserving of acknowledgement.

“Forty years after her passing, she is starting to get some notice and respect, both for her scientific achievements and her pioneering role as the first lady of optics,” remarked Carl Zeiss Vision Vice President Karen Roberts. “It's about time.” 🍷

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If you wear progressive lenses, give thanks to Dr. A. Estelle Glancy.



From the Octopus — to the Office

by Elisa DeMartino



Serendipity. That's what Dr. Shelby Temple calls his transition from the world of marine biology to that of optometry.

While researching the function of sight in cephalopods, which are colorblind but detect colors via polarized light, this Canadian scientist and inventor found a way to measure macular health in people.

"I developed the core technology for this device by mistake. It was originally designed to measure octopus vision but I noticed, during the experiments, that I could see interesting patterns when looking at the polarized light fields," described Dr. Temple in an interview earlier this year.

The patterns are known as Haidinger's brushes, humans' only discernment of polarized light. The visual phenomenon appears as a faint yellow bowtie or hourglass caused by the shadow formed on our retina by macular pigments.

Dr. Temple discerned that to what extent people might see this pattern directly correlated with the health of their macular pigments. While high macular pigment density is associated with healthy eyes, unchecked low levels can lead to macular degeneration later on in life and, ultimately, loss of vision.

So, with a lifelong career studying ocean life, four years ago Dr. Temple dove into the deep end of business by opening Azul Optics (Bristol, U.K.), a medical equipment company offering up a human-optimized version of the device to be used in optometrists offices.

Real world applications

Dr. Brian Tompkins of Tompkins Knight and Son Optometrists (TK&S) based in Northampton, U.K., was introduced to the MP-eye by chance during a clinical conference.

"Getting to know Shelby there, and talking with him about his passion, it was almost a no-brainer that we would be using the device." Dr. Tompkins spoke to *COOKIE* enthusiastically when asked about his experience.

Dr. Tompkins is impressed with the instrument's easy usability and particularly of how palatable the scoring system is for patients, assigning them a number from 0 to 10 according to how low or high their macular pigment density is.

"The score is extremely valuable; giving that score a quantitative measurement of good or bad is super helpful for them. It's so efficient clinically at giving a lowdown on what may happen in their future," he explained. Plus, patients only need three minutes with the device, so it doesn't complicate check-ups.

According to a patient's score, practitioners get an idea of their lifestyle and eye maintenance habits and can then educate them on how to improve pigment levels.

A distinct indicator that the scoring system is being taken seriously by TK&S patients? The practice has had the device for only a year and their sunglasses sales have doubled. "From the point of view of protection it gives a real capability to talk around: 'How is your sun protection?' And a lot of people would look at their sunglasses and realize they're really rubbish, and so there was a massive upgrade capability."

Sunlight exposure is linked directly to macular degeneration, and while we can't totally halt that (yet!), Dr. Tompkins suggests to every patient regardless of their score: sunglasses, hats and getting all of their vitamins.

"They change their lifestyle, they're conscious of their eating habits ... and they're always excited that red wine is a good thing!"

Contributing Doctors



Dr. Shelby Temple is a visual neuroscientist from the University of Bristol and is the co-founder/director at Azul Optics. His research led to the invention of a new ophthalmic instrument (MP-eye) that detects a risk factor for age-related macular degeneration (AMD). His success in commercializing the MP-eye led to him receiving the Innovator of the Year Award from the UK Biotechnology and Biological Sciences Research Council. Dr Temple develops and delivers education and training courses on the dangers of blue light and reactive oxygen species as well as how macular pigments protect the retina from photochemical damage and help prevent AMD.

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Dr. Brian Tompkins is an experienced independent practitioner in his stunningly refurbished and contemporised Victorian house-practice in Northampton, U.K. Tompkins Knight and Son Optometrists (TK&S) is currently the U.K. Contact Lens Practice of the Year. Dr. Tompkins is past president of the BCLA and a former AOP Contact Lens Practitioner of the Year. He lectures internationally on business, imaging technology, dry eye and specialist contact lens topics, all based on real life experience in the consulting room. Dr. Tompkins learned that people retain more by being entertained while being educated and so since that time, his lectures and workshops have been interactive and fun, sometimes even hilarious, but always informative. He is maybe optometry's best known "edutainer."

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New Contact Lenses Reduce Itchy Eyes from Allergies

by Jillian Webster

A visit to the optometrist is not just about refractive correction — and for many, ocular discomfort due to allergies is also a big concern. Allergic conjunctivitis (AC) is a common form of eye irritation due to the body's response to certain allergens on the optic surface. Grasses, trees and family pets can contribute to AC, which becomes more difficult to treat if the individual uses contact lenses.

Although many topical treatments are currently on the market, Johnson & Johnson Vision (Jacksonville, Florida, USA) has introduced an exciting new product that may offset the woes brought on by AC: the world's first and only drug-releasing combination contact lens for vision correction and allergic eye itch: ACUVUE® Theravision™ with Ketotifen. This new product uses the already trusted ACUVUE technology with antihistamines in order to combat eye irritation.

The science behind the lens

Ocular itch due to allergies is one of the most common ailments contact users face. A 2019 study* described the most common cause of AC is from the presence of allergens.

The authors said: "The itch response is due to conjunctival mast-cell release of histamine and other inflammatory mediators." Many



topical treatments have been developed in order to treat this problem such as antihistamines including: olopatadine, bepotastine or ketotifen. The study described these treatments as "second-generation antihistamines are characterized by a rapid, prolonged suppression of allergen-associated itch responses." In order to combat itchy eyes, many patients choose to use topical treatments that block overactive inflammatory responses.

However, topical treatments are far from perfect. Often contact lenses need to be removed to apply topical drops and there are concerns regarding the impact they might have on the durability of the contact lens. Luckily, we now have a product that will make itchy eye relief much easier.

A new lens arrives

In March 2021, Johnson & Johnson

announced approval from the Japanese Ministry of Health, Labour and Welfare (MHLW) for these novel lenses. This was followed by an April 2021 announcement that the company received approval by Health Canada for these first-ever daily disposable contact lenses. The Theravision contact lenses incorporate the antihistamine ketotifen into its design, which offers long-lasting comfort for wearers.

And this product is supported by research:* "By combining a contact lens and a drug such as ketotifen, allergy sufferers who wear lenses can receive reliable daily allergy relief that lasts for as long as they typically wear the [contact lenses], while avoiding potential adverse effects of preservatives commonly found in topical ocular preparations."

There is no evidence from the study that the incorporation of the drug into the lens solution has any structural, optical or refractive effect on the lenses. Thus, current contact users can look forward to reduction in itchy eyes without compromising optical acuity.

Future of care

Johnson & Johnson Vision has been dedicated to improving the eye health of people all over the world for many years. And the incorporation of the ketotifen antihistamine into Theravision contact lenses is revolutionary. Should more countries around the world continue to approve the lens, it could become one of the more exciting products created by the company — especially if you ask contact wearers with allergen-related itchy eyes. Indeed, both eyecare professionals and their patients will benefit ... and can look forward to a more comfortable future in vision. 🌟

* Pall B, Gomes P, Yi F, Torkildsen G. Management of Ocular Allergy Itch With an Antihistamine-Releasing Contact Lens. *Cornea*. 2019;38(6):713-717.



All About Small Pupils, Speed and Automation

Get dilation-free, cutting-edge retinal imaging with the DRSplus *by Brooke Herron*

This tricky situation gets further complicated in patients with media opacities or who have small pupils (2.5 mm): For example, with a traditional fundus camera, acquiring clear images through pupils smaller than 3.5 mm is challenging. And as blurred images do us no service, it's clear that new technologies like the DRSplus are needed.

In busy clinics, eye care professionals' time is a hot commodity. Fortunately, eye care technology is constantly innovating and companies like iCare Finland Oy (Vantaa, Finland) are lighting the way. The Finnish company provides solutions for comprehensive screening, diagnostics and monitoring of glaucoma, diabetic retinopathy (DR), and macular degeneration (AMD).

One of these solutions is the DRSplus, a TrueColor confocal fundus imaging system that produces superior-quality images of the retina in an efficient, automated and dilation-free process.

And okay — this sounds great — but what really sets the user-friendly DRSplus apart from the pack is this: The combination of speed, automation, and ability to image small pupils (down to a minimum 2.5 mm) with unprecedented quality. These factors allow physicians to screen patients faster (and thus, see more patients daily) with the same accuracy.

This is possible because of TrueColor confocal technology, which utilizes a combination of confocal optics and white LED light to provide accurate documentation in life-like colors.

This clear, authentic view of the retinal landscape shows even the smallest details — and this allows eye care professionals to focus their attention on what's most important: detecting, diagnosing and treating pathologies. Plus, the ability to acquire images in a dilation-free and bright light environment saves practitioners both time and effort.

Further, the DRSplus is fully automated — which means that it does not require a specialized operator. Simply ask the patient to place their face on the device's front and press start — and voilà. Each eye takes 16 seconds to photograph, and in 30 seconds, the system provides detailed 45° images of both eyes. This simplicity, combined with general ease-of-use, makes the DRSplus an especially convenient tool.

No dilation needed

We know that bright lights, and even some pharmaceuticals, can cause the pupil to shrink — and this is fine ... until we need to obtain a retinal image. Of course, for traditional imaging systems, this can be rectified with a dark room or eye dilation; however, patients aren't overly keen to have their eyes dilated, in general.

See through media opacities

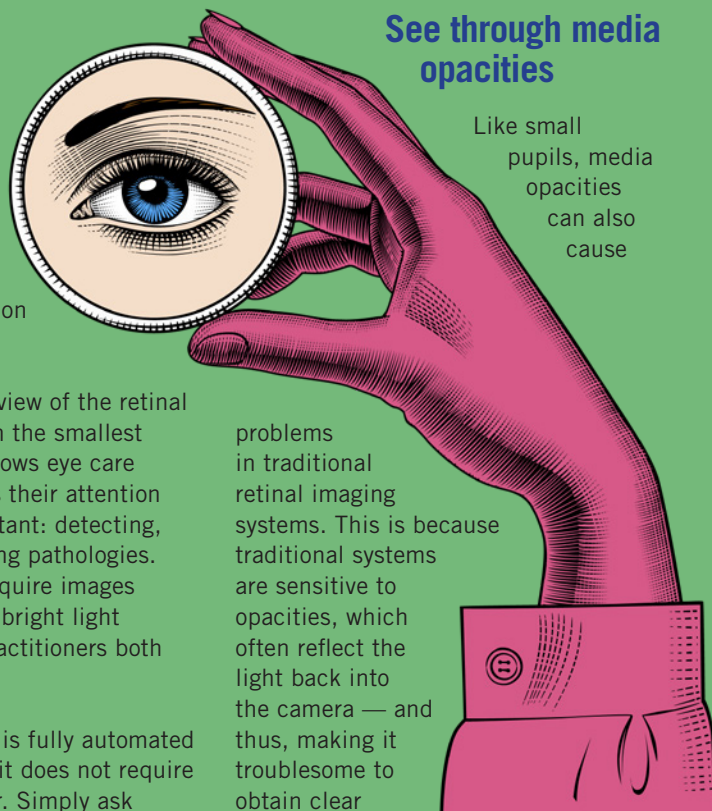
Like small pupils, media opacities can also cause

problems in traditional retinal imaging systems. This is because traditional systems are sensitive to opacities, which often reflect the light back into the camera — and thus, making it troublesome to obtain clear images of the retina.

However, the DRSplus jumps this particular hurdle thanks to its confocal optical engine, which produces a beam of light that is very narrow, precise and focused. This allows for clear retinal imaging, even in cases with severe cataract.

And of course, during the ongoing COVID-19 pandemic, safety is another key concern among physicians and patients alike. To address the need for social distancing, iCare has added optional Remote Exam software. This allows retinal images to be acquired and reviewed from the safe distance of several meters. 🦠

For more information on the DRSplus and other innovations, check out iCare's website: www.icare-world.com.



iCare DRSplus is an easy-to-use and intuitive imaging system that requires minimal staff training to obtain the highest quality images.





Spotlight on Optometry in Cambodia

by Chow Ee-Tan



In Cambodia, optometry is still at its infancy: There is no academic training nor legislation for optometry. And although eye health personnel are aware of the important role of optometry, the general population has limited awareness of the field.

Cambodia does not have a certified optometry program; however, since 2008, there has been a refraction training program. This is coordinated by the National Program for Eye Health (NPEH) within the country's Ministry of Health and includes a six-month full-time curriculum, which is funded by the Fred Hollows Foundation and Brien Holden Foundation. To date, 157 refractionists have been trained and deployed in public and private hospitals across the country through this initiative.

Insights from the ground

Mr. Chea Seila is one of the pioneer

optometrist technicians in Cambodia. He was trained by Southeast Asia Outreach (SAO), a U.K.-based organization. Unfortunately due to political unrest and financial problems, the optometry training program ended in mid-1997.

"After graduation, we set up the Cambodian Optometry Association (COA) in 1997 where we conducted community outreach for refraction screening to provide glasses to the communities across the nation," said Mr. Seila. COA created a refraction training center to deliver courses on refraction and spectacle dispensing to government eye health personnel. He said a total 19 optometric technicians were trained between 1997-2007.

Today, Mr. Seila is a national refraction trainer at the National Refraction Training Centre (NRTC) at the NPEH. He works under the Brien Holden Foundation and in July 2021, he will begin working as an optometrist with

the Fred Hollows Foundation.

"The Fred Hollows Foundation worked in collaboration with the Brien Holden Foundation and National Program for Eye Health to set up the National Refraction Training Centre under the umbrella of the Ministry of Health," he said.

Mr. Seila is still actively involved in teaching refraction and spectacle dispensing modules. He also helps to review the curriculum and oversees the quality of training that teaches new national refraction trainers in teaching methodology.

In addition, the NRTC has trained many nurse refractionists: "Nurses in Cambodia graduate nursing school with a three-year academic education following high school. They then continue ophthalmic nurse study for a further 12 months to obtain a bachelor degree (from the University of Health Science). After that, they can then



Help arrives from overseas

“Formal optometry doesn’t really exist in Cambodia. Those in the profession are loosely classified as optometrists,” said Dr. Suit May Ho, a Melbourne, Australia-based optometrist working in public health and international eye health. Previously, she taught refraction trainers in Phnom Penh, Cambodia, for more than a decade.

Dr. Ho is an optometry and primary care advisor at the Fred Hollows Foundation. Prior to that, she was employed at the Brien Holden Vision Institute Foundation, most recently as director of education and development.

She has worked extensively in the development and implementation of sustainable eye care and education programs in various countries in Asia-Pacific and Africa, as well as in Haiti and Moldova. Her work includes delivering refraction, low vision and trainers’ courses for various cadres of health workers, including mid-level ophthalmic personnel, refractionists, eye nurses and ophthalmologists.

Dr. Ho recruited Mr. Seila in 2008 when she was with the Brien Holden Foundation (then called the International Centre for Eye Care Education).

“Seila was the one of the first in Cambodia to be trained in refraction by a group of volunteers from the U.K. from the late 1990s. There were four of them, and after they were trained for a year, they started training others to do refraction,” said Dr. Ho.

In Cambodia, she helped to establish the NRTC by providing the initial education of the Cambodian trainers, who then went on to teach others.

“We did a refresher course. We selected some trainers and developed a curriculum for refraction training for

eye nurses. The refraction course was three months long,” she said, adding that there were 12 NRTC trained nurses and they trained others. Dr. Ho visited Cambodia to monitor the training courses.

“Later, we advocated for non-eye care nurses to be trained as well, and extended the duration of training to six months: three months training on the eye and basic eyecare, and then three months on refraction. [This was done because] there was a need for practitioners to identify other eye problems and refer patients to eye doctors.”

The program, known as The National Refraction Training Centre Programme, under the government’s NPEH, went on until 2017; now, the NPEH continues to implement the refraction course. Today, about 200 eye care practitioners have undergone the training.

“The Foundation has built a sustainable program and the in-country partners have continued conducting the courses. The initial educators return to reevaluate the training and help to mentor more trainers,” she said. At this point, Dr. Ho’s involvement has lessened as local specialists have taken the reins. Her last visit was in 2015.

Dr. Ho, who is passionate about the development of optometric education, particularly in low-and-medium income settings, was instrumental in the development of a bachelor’s degree in optometry in Vietnam. With her experience, the NPEH was interested in replicating this in Cambodia.

“Unfortunately, there weren’t enough resources or capacity to establish an optometry degree program in Cambodia. To set up an optometry school, there needs to be a concrete

plan with a lot of investment and resources — and there is a lack of human resources to teach optometry in Cambodia.

“At the moment, they may have a certain amount of training as optometrists and refraction is just a small part of optometry. They need a lot more foundation in basic sciences, training in eye diseases, eye examination skills, as well as access to equipment. There are limited opportunities for them to expand their knowledge and skills as language is also a barrier,” she said.

In Cambodia, Dr. Ho says the optometrist’s role is seen mainly in prescribing glasses.

“Not too many optometrists can practice what they have learned because public expectations are quite different compared to those in Australia, for example. Often when people go to optical stores, they do not expect a comprehensive eye examination. They expect refraction and the prescription for eyeglasses or contact lenses.

“In time, this will change with advocacy from the professional optometric associations. People will start to understand that they can expect an eye health examination as part of their eye test,” she said.

In the meantime, the refractionist training in Cambodia will continue. There is a need for personnel who can prescribe glasses, and the fees collected from the trainees are sufficient to keep the course going.

“I know Cambodians would love and hope to have a formal optometry course in the future. They are very aspirational. They want to improve their knowledge and to improve themselves in the discipline,” concluded Dr. Ho.



pursue the six-month full-time course in refraction and spectacle dispensing training,” said Mr. Seila.

The Optometrist Society of Cambodia

In 2007, together with like-minded refractionists/optometry technicians, Mr. Seila founded the Optometrist Society of Cambodia (OSC) to improve and promote the professionalism among its members, and to advocate for formal optometry education in Cambodia. He now serves as OSC president.

OSC membership includes graduated optometry technicians and refractionists and as of 2020, there were a total of 178 registered members, working for government hospitals, private clinics, NGOs and optical shops.

Mr. Seila and his OSC colleagues are actively involved in decision-making to advocate for the important role of optometry in eye care. They serve as a close liaison with government and non-governmental organizations, both in Cambodia and overseas. This ensures cooperation among agencies, introduces and develops optometry services, and helps with the efficient deployment of resources.

The committee plays a key role in responding technical needs of its members and organizing and facilitating the annual refraction education workshop. They also conduct community outreach activities to provide spectacles and referrals for further treatment.

Mr. Seila also works closely with the NPEH and the University of Health Sciences, national and sub-national partners, and NGOs. These partnerships aim to design and develop eye health care projects to focus support, as well as create strategic plans and policies, on blindness prevention and control, with the ultimate goal of eliminating avoidable blindness in Cambodia.

The OSC is part of other international optometry agencies, including Asia-Pacific of Optometry Council (APCO) and Asia Optometric Congress (AOC).

Challenges and future of Cambodian optometry

There are many challenges faced by optometrists when delivering eye care in Cambodia, said Mr. Seila.

“There is still a limitation of skills and knowledge among optometry professionals. Existing optometric technicians and refractionists need to upgrade training and recognize international standards,” said Mr. Seila. “There is a lack of quality control of service providers in optometry and refraction, and limited equipment and instruments.”

He says refractionists have their own core responsibilities at their respective hospitals and as such, they perform the task on a part-time basis.

Today, Cambodia only has nine optometrist technicians and 157 refractionists. It is a far cry from the WHO standard of 1:50,000 refractionists per population.

Mr. Seila strongly supports the development of an optometry training program in Cambodia for future generations. He added that the interest and engagement of the private sector is essential to increase the number of professional workers.

“A full academic training should be established in Cambodia and we should broadly advocate for optometry professionals to be recognized at all levels nationally,” he said. “The government should consider transforming the National Refraction Training Centre to be an optometry faculty at the University of Health Science.”

An increase in annual continuing education workshops for learning and sharing, improvements in quality, as well as involving international optometrists would help to share expertise with local staff.

“Our optometry practice must be upgraded to meet the international standards where exchange learning programs are encouraged. Mentoring programs are essential for strengthening technical skills, quality control and networking.

“The local, national trainers have the potential to upgrade their professional level by advancing their knowledge and skills through seeking international scholarship training programs abroad,” concluded Mr. Seila. 🧠

Contributors



Dr. Suit May Ho graduated from optometry at the University of Melbourne, where she also earned her PhD. Dr. Ho is part of the medical team at the Fred Hollows Foundation as an optometry and primary care advisor. Based in Melbourne, Australia, Dr. Ho is working on implementing the Foundation's refractive error strategy and its integration into program activities, including improving the quality of cataract surgery. Dr. Ho serves on the World Council of Optometry Education Subcommittee, Optometry Victoria South Australia Education Advisory Committee, the International Agency for the Prevention of Blindness in the School Eye Health and Low Vision Working Group. She is also a fellow of the Australian College of Optometry.

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Mr. Seila Chea is a National Refraction Trainer at the National Refraction Training Center (NRTC) of the National Program for Eye Health, Ministry of Health, Cambodia. He is currently an optometrist with the Fred Hollows Foundation. He graduated as an Optometrist Technician in 1996 in the second batch of training by the Southeast Asia Outreach (SAO), an organization based in the United Kingdom. He has worked with local NGOs to run an optometry clinic, has been involved in community outreach for refraction screening and providing glasses for the people. He also set up a refraction training center to deliver courses to the government eye health personnel in refraction, spectacle dispensing and eye health. Mr. Seila is founder and president of the Optometrist Society of Cambodia (OSC) that strives to improve and promote professionalism and to increase the clinical job scope of optometrists and refractionists in Cambodia. He works closely with the National Program for Eye Health and the University of Health Sciences, NGOs and partners to develop eye healthcare projects that support the country's strategic plans and policies on blindness prevention in Cambodia.

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Be Cool, Cataracts

A growing public health crisis

by Andrew Sweeney

There are some things in life that enjoy a brief moment in the proverbial sun in culture, a passing fad that captures the attention of the public before fading into obscurity. For example, who now continues to wear the Lance Armstrong “Live Strong” bracelet, and what about Crocs shoes? Other things however, remain cool for much longer and popular for years and years, like classic Italian cut suits, fine Cuban cigars, films from the golden age of Hollywood, and the music of Frank Sinatra.

The point is that some things will always be cool because they’re, well, cool, and we wouldn’t be a good magazine about “cool optometry” if we didn’t talk about one of the conditions that continue to prove fascinating for clinicians. This would be cataracts,

and it’s cool not just because this artist needed it to fit his introductory lede, but also because it’s one of the oldest recorded medical conditions. Indeed, the first recorded mention of this common eye complaint is from a statue from the ancient Egyptian Fifth Dynasty (2467-2457 BC), how’s that for a timeless classic?¹

A cataract is the clinical correlation (or coming together) of opacity or light scattering in the eye lens, usually caused by the presence of high molecular weight protein aggregates or disruption of the lens microarchitecture. This causes the eye to have a milky, cloudy appearance and can affect a part of the patient’s lens or its entirety. As a result, one’s visual acuity becomes diminished, often described as misty in nature, and the affected person

may be more easily dazzled by vehicle headlights, while also noting that objects may appear to be less colorful.²

Clouds should stay in the clouds, not in a lens

Naturally, this becomes rather inconvenient for the patient who often presents these symptoms during an eye examination at their optometrist. As a result, optometrists are the first line of defense in the disease and the role that they play in diagnosing patients and recommending further treatment is extremely important. This is especially the case in more severe cases where a change in lens prescription is not sufficient.

Cataracts can occur at any age,



but they are most frequently encountered in older patients and the risk of contracting them increases exponentially with age. Diagnosis is usually a multi-faceted process, taking into account the patient's age, but also their medical history; other factors, such as smoking, increases the risk of cataracts and often causes the cataract to develop earlier and more quickly. The primary focus of diagnosis is a visual acuity test, most commonly a confrontation field test where the optometrist flashes several fingers in each of the four quadrants of the patient's visual field. Clinicians should also use a slit lamp to look for a yellowing of the lens, clefts/fissures, or white opacities that indicate the presence of cataracts.³

As already mentioned, an optometrist can provide cataract treatment if the case isn't severe, but more advanced diagnoses can require surgical intervention which can only be performed by an ophthalmologist. This involves removing the patient's cloudy lens and replacing it with an artificial lens, also known as an intraocular lens (IOL). A typical surgery begins with small incisions being made in the side of the eye, followed by phacoemulsification to dislodge the

cloudy cataract (although there are other methods as well). This process is one of the most commonly performed surgical procedures and 95% of patients are completely satisfied with the results.⁴

Cataracts: A ticking time bomb?

Cataracts are most associated with the elderly, to be sure, and the global trend of aging populations is making the disease an increasingly worrisome health concern. Surprisingly, in some countries, there is also a lack of information about the condition in the wider public. Not only does this have a significant impact on their quality of life it also has considerable economic and societal ramifications.

Take the People's Republic of China, the most populous country in the world, which appears poised to follow the demographic trends of Western countries by witnessing its population becoming increasingly older. In a landmark report by a group of researchers based in-country as well as in Scotland, relevant articles on the prevalence of cataract or cataract blindness in the Chinese population

published from January 1990 onwards were examined in detail. They found that the cataract prevalence rate was 6.71% (95% CI = 5.06-8.83) in people aged 45-49 years to 73.01% (95% CI = 65.78-79.2) in elderly aged 85-89 years.

The researchers concluded that "cataract and cataract blindness will continue to be a leading public health issue in China due to the aging population," and it's not hard to see why. With over 73% of the elderly with cataracts, a population cohort that is continuing to grow, the problem is a serious one. Optometrists will be on the front line of fighting this growing concern too, as they will be the first to diagnose many patients.⁵

So, for the optometrists out there concerned with cool cataracts, and the less cool aspect in that they represent a growing public health concern, we can advise that it's crucial to make sure patients routinely get their eyes tested, especially the elderly. Once a year if the patient is over 40 would be a good figure to aim for, especially if they have a history of smoking or other risk factors. As for China specifically, more support and research for clinicians would be great, and we'll be there to report on it. 🍷



Even cute kittens can get cataracts.

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OIS Webinar Offers Fascinating Deep Dive into Myopia

by Andrew Sweeney

Ask any eye care specialist about the great issues in eye care today, and the answer is likely to be myopia. Around the world, and particularly in East Asia, rates of the condition are increasing exponentially. Indeed, according to some estimates, half of the global population could well be myopic by 2050.

We have recently covered the issue in great detail — and the Ophthalmology Innovation Summit (OIS) is also giving myopia considerable (and deserved) attention. Indeed, the Myopia Innovation Showcase featured all that we have come to expect from the OIS. The webinar was opened by Dr. Joe Rappon, the chief medical officer at SightGlass Vision (Dallas, Texas, USA).

A growing market, indeed

Dr. Rappon's journey with myopia began when he was 11-years-old — and his first eye exam spurred him to become an eye doctor. After a brief historical overview of the condition, Dr. Rappon described myopia as an accelerating problem, as 1 in 2 people will be myopic by 2050, and 1 billion will be highly myopic. He emphasized that a myopic eye is not a healthy one, with increased risk for glaucoma and retinal detachment, among other sight-threatening conditions.

The first presenter was Matt Oerding, board chairman of the Global Myopia Awareness Coalition (Irving, Texas, USA). His presentation focused on the market overview of myopia, which includes more than 55 million children aged between 6-17 — and this segment is experiencing significant growth due to increasing incidence. By 2050, Oerding reports that there will be over a \$200 billion market opportunity, which can be achieved by focusing on public awareness, regulatory approval and better training.

Next up was Thomas Chalberg, CEO

of Sight Glass Vision (Palo Alto, California, USA). In an effort to deliver innovative, science-based treatments that address the myopia pandemic in children worldwide, the company is developing diffusion optics technology that uses light scattering to manage myopia. Chalberg reported that in one study, up to 65% of subjects reported a change in baseline cycloplegic spherical equivalent refractive error at 12 months.

Smart solutions solve common problems

Next was iVeena Delivery Systems (Salt Lake City, Utah, USA), a clinical-stage ophthalmology company that develops non-surgical, non-invasive, pharmacologic innovations. Represented by President and Founder Dr. Bala Ambati, he described how his company is advancing myopia treatment development with the IVMED-85 for pharmacologic corneal and scleral cross-linking. This is designed to increase lysyl oxidase modulates by flattening the cornea, stiffening the sclera and reducing axial elongation.

Following this was Ran Yam, CEO and founder of Nova-Sight (Airport City, Israel). He spoke about Nova-Sight's work on eye-tracking pediatric solutions, and in particular, its Active Glass myopia control wearable solution, which features eye elongation monitoring, automated and objective visual acuity testing, and is designed to be simple enough for a child to operate.

Patrick Johnson was the next presenter to speak in his capacity as the chief business officer of Sydnexis (Del Mar, California, USA). Johnson described how his company believes that treating myopia with low-dose atropine has been shown to slow progression. He said Sydnexis has a best-in-class product to achieve this, while maximizing stability and tolerance: the SYD-101 eyedrop, which is designed to be applied nightly.

Kubota Vision (Seattle, Washington, USA) was next up, represented by Founder and CEO Dr. Ryo Kubota. His company is developing myopia-focused smart glasses, the Kubota Glass, which is currently in the clinical trial and product engineering stage. This solution is based on peripheral myopic defocus and uses an augmented reality optical system to achieve stimulation designed to enable the retina to move forward.

Dr. Andrei Tkatchenko, PhD, spoke for Dioptragen, a drug development company targeting myopia (New York, New York, USA). The company is also studying atropine as a tool in mitigating myopia and is looking at six drugs (specifically, eyedrops) that have shown particular efficacy. In particular, LE420 is already undergoing phase 1 studies involving up to 20 subjects and is expected to move to phase 2 soon.

The penultimate presenter was Dr. Barry Linder, president and CEO of Reopia Optics (Bellport, New York, USA). His company's mantra is to intervene as early as possible in a child's development of myopia to leverage the growing eye's elasticity by modifying the visual input with proprietary optics. To that end, the company is working in two directions (decreasing myopia-caused stimulus and increasing myopia suppression signals), and is seeking initial funding.

Last but not least was Euclid Systems (Herndon, Virginia, USA), represented by Vice President of Global Marketing, Nitin Jain. He spoke about his company's focus on orthokeratology which led to the development of the Euclid Emerald, a multi-curve lens. Designed to be applied comfortably to a child's eye regardless of its shape, Jain said the lens was at the forefront of myopia treatment. 🧐

Editor's Note:

The Ophthalmology Innovation Summit (OIS) Myopia Innovation Showcase took place online on April 29, 2021. Reporting for this story took place during the webinar.



Does he hold the secret to the next pharmaceutical approach?

into the role that genetics play in determining myopia risk factors. She said that next-generation sequencing (NGS), which can be used to determine the order of nucleotides in entire genomes or targeted regions of DNA or RNA, shows remarkable promise in identifying those with inherited high-risk myopia. She also said that using a genome-wide association study (GWAS), which associates specific genetic variations with particular diseases, can be useful in identifying the risk of common myopia.

If myopia is to be tackled as a global public health crisis, then a pharmacological perspective must also come into play. As such, the current and potential future methods of treating the disease were covered by Dr. Christine F. Wildsoet, a professor of optometry and vision science at the University of California, Berkeley. Dr. Wildsoet provided a comprehensive and educational overview of current pharmaceutical approaches to treating near-sightedness, including a particularly interesting section on the optimum concentration of topical atropine (at 0.05%). She also said that the future of myopia treatment is likely to include gene therapy, collagen cross-linking and stem cell therapy.

The rest of the symposium is still available to view on ARVO's virtual platform, which can be found at <https://arvo2021.arvo.org/> — so make sure you log in and check it out if you're interested in learning more about myopia. There are plenty of other events, posters, abstracts, etc., to view and some great debates on some of the hot topics in optometry. In the meantime, ask yourself: What can you do to help prevent the coming myopia pandemic? 🍷

ARVO Symposium Covers the Latest and Coolest in Myopia Management

by Andrew Sweeney

By this point, if you're a regular *COOKIE* reader, you'll know that myopia is a pretty serious problem. Indeed, this form of near-sightedness is a growing pandemic of COVID-19 proportions, and while it's particularly severe in East Asia, no part of the globe is safe from its relentless advance. In a few years, it's even likely that most young people in many countries, especially China, will be myopic.

So naturally, given the bleak prospects for myopia's progression, it's not a surprise that the condition is frequently a topic of discussion at many of ophthalmology's major conferences. *State of Refraction: Etiology, Comorbidities, and Treatments for the Worldwide Myopia Epidemic*, held during the recent Association for Research in Vision and Ophthalmology

Annual Meeting (ARVO 2021), was the latest symposium to tackle the issue. Bringing together researchers from around the world, the event was a two-hour-long deep dive into near-sightedness and its relation to refractive surgery.

The symposium kicked off with a presentation by Dr. Lisa Ostrin, an associate professor at the optometry department at the University of Houston (Texas, USA). She reported on her work with the stratification of different forms of myopia and provided some actionable insight into forms of refractive error. Dr. Ostrin also pointed out the economic cost of myopia, which she said totals \$225 billion worldwide each year.

Dr. Hathryn Rose PhD, a professor at the University of Technology Sydney (Australia), provided fascinating insight

Editor's Note:

The ARVO 2021 Annual Meeting was held virtually from May 1-7. Reporting for this story took place during the event.



Myopia Management in China

Perspectives from young ophthalmologists *by Brooke Herron*

In China, the rate of college-aged students with myopia is 60%, and that's steadily increasing. "I don't have direct evidence that it comes from this technology [smart phones and devices], but undoubtedly, smart devices really changed the way we use our eyes ... and I personally believe there is some association in the increase in myopia before and after 2008 [when smartphones were introduced]," he shared.

The eye and stem cells: The path to treating blindness

Could stem cells be the answer to treating the myopia epidemic? During her presentation, Dr. Zhang Mingqi discussed the possibility of using human retinal progenitor cells to counteract the threat of serious eye conditions associated with high myopia.

"Intravitreal injection of human retinal progenitor cells (hRPCs) is a safe and effective way to delay the

Worldwide, myopia is an epidemic — however, it's most prevalent in Southeast Asia and China. During the session *Eye Care Thought Leadership from Chinese Young Ophthalmologists* — (supported by He Vision Group), five ophthalmologists shared their thoughts on its causes, prevention and treatment.

Can youth visualize the future?

"In the year 2050, myopia prevalence will reach nearly 70% globally — this is quite alarming and it worries me a lot. Not only from the clinical perspective, but it's also a big economic burden to countries who have large myopic populations," said Dr. He Xingru.



process of retinal degeneration, which may be via the paracrine function of transplantation of hRCPs," she said.

Myopia susceptibility and gene screening in China

Gene screening is one tool to determine who might become myopic. The causes of myopia are multifactorial, and Dr. Hu Lan shared that there are two main factors that lead to myopia: genetic/nature (i.e., ethnicity and family history) and environment/nurture (i.e., near work, posture, illumination, lifestyle and nutrition). For example, if both parents are myopic, the chance of their children being myopic is seven times higher.

"If we combine the genetic factor of two myopic parents with the factor of 'higher education' the risk factor is an astonishing 52 times higher than those without those risk factors," she shared. Higher education is often associated with more near work using computers and reading.

But who should pay more attention to environmental factors and which factors should be changed first? "This is where gene testing can help us," said Dr. Hu Lan.

China's national training base for the prevention of blindness

During her presentation, Dr. Yan Chunhong explained the various issues with access to eye care in China. In addition, training and education of optometrists and ophthalmologists is also not consistent.

Because of these issues, in 2012, the first China National Training Center for the Treatment and Prevention of Blindness was established in the He Eye Hospital, which is supported by the government, as well as NGOs. Here, surgeons receive vital training in different surgical techniques including cataract, as well as refractive training.

"Now, we would like to join hands with other organizations, not only in China, but also NGOs from other countries to duplicate this Chinese model in other countries," concluded Dr. Yan Chunhong.

Ora in China

ORA is the world's leading ophthalmic research organization, which is expanding into China.

"Our vision for the future is to create vision beyond what we can see and to use our company as a force for good," said Dr. Peng Wang, vice president of Ora China. "We would like to expand our ophthalmic global expertise into the Chinese market and bring true value to customers, to bring innovative products to meet unmet medical needs for Chinese patients.

"To achieve this goal, first we will provide high quality data compliant with local regulatory requirements. Second, we will provide specific study design with innovation and skills. Third, we will expand OraNet into China ... lastly, we will apply our worldwide learnings in China working with our global teams," added Dr. Wang. 🐘

Editor's Note:

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INDUSTRY UPDATE

Bausch + Lomb Specialty Vision Products Business Expands Access to ScleralFil® Solution for Patients

Rigid lenses currently account for an estimated 11% of contact lens fits and refits. Moreover, research shows the number of individuals who need access to customized, specialty lenses and lens care products has consistently increased over the past decade.

In an effort to increase access and availability for scleral lens patients, Bausch + Lomb, a leading global eye health business, is offering

ScleralFil® sterile buffered solution for scleral, soft and rigid gas permeable contact lenses, with no preservatives on Amazon.

Scleral lens wearers, with ocular surface disease, including dry eye disease (or DED), will now have a fast and convenient way to maintain their recommended scleral lens care regimen with increased access to ScleralFil®.

ScleralFil®—indicated as a scleral insertion solution—is an alternative for rinsing and inserting scleral lenses. It is a sterile, buffered isotonic saline solution that can be used to rinse soft and gas permeable lenses prior to insertion, as a rinse for contact lens cases, and for rinsing contact lenses throughout the day.

Source: Bausch + Lomb



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