THE WORLD'S FIRST FUNKY OPTOMETRY MAGAZINE





Cool Optometry • Optics • Kudos • Innovation • Enlightenment



Cover Story p18

THE DISPARITY AND FUTURE OF EYE CARE IN ASIA-PACIFIC

What about our future?

"I'm going to be a surgeon!" Joe, 8 years old

> "I'm going to be a designer!" Lilly, 10 years old



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Making great strides in therapeutics and technology

We are looking for eye doctors who can contribute articles to *COOKIE* magazine. Interested? Let's talk! Send us an email at editor@mediamice.com.

To place an advertisement, advertorial, symposium highlight, video, email blast, or other promotion in *COOKIE* magazine contact CEO Matt Young at matt@mediamice.com.

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LETTER TO READERS

ecome to COOKIE magazine!

ou may know us from *PIE*, you may know us from *CAKE*... and now, we are thrilled to present you with the latest "bun" from our editorial eye care oven: *COOKIE*, which stands for Cool Optometry, Optics, Kudos, Innovation and Enlightenment.

As my latest brainchild (that's me, Media MICE CEO Matt Young), *COOKIE* completes our "menu" of educational (and funky) publications devoted to eye care. And although we are Asia-Pacific-based, our coverage is global — which allows for information and knowledge sharing from the world's top experts.

We are, of course, also a bit more "funky" than your traditional eye care magazine or journal — let's say, we're the publication with "extra sprinkles." Part of that is attracting the talent and expertise to take us to that next level of "cool." So, when we met Dr. Kristie Nguyen, an optometrist from Florida, we knew we had met a key ingredient of *COOKIE*. As an advisory board member, Dr. Nguyen will help guide our stories, adding her own fresh insights, style and delicious ingredients.

But rather than me rambling on . . . let's hear from her. Cheers,



It's also an opportunity for me to share what has become a lifelong passion for me: Returning sight to those who have lost it. This idea came to me during junior high while in church — there was a sermon on how God returned vision to the blind. This was my "a-ha" moment . . . this is something I could do: I could give people back their sight with eyeglasses or contact lenses. To me as an optometrist, there's nothing better than helping someone else see.

And although I'm based in the United States, I hope my experiences here will benefit others . . . and to see things from another perspective. Even in Florida, where I've practiced for 15 years, there are still so many people who don't know what we, as optometrists, do. So, I've made it part of my mission to educate people through social media. I create "fun" posts to bring more awareness to our industry, this includes my #WednesdayWisdom posts on LinkedIn.

I also don't believe that education about eye care should be limited to a region or location — everyone has eyes, and there are simple things we can do daily to improve our eye health.

Not only that, but eye care should be accessible to all. (See our cover story on this topic in our called "The Disparities and Future of Eye Care in Asia-Pacific" on page 18.) Further, it's my dream to visit these places and to do more mission trips internationally to help improve the life of those who need to see who can't afford it otherwise.

Working together, to continue spreading awareness, education and access, we can truly make a difference.

All the best,

Kristie / Jouyen 0.D.





Dr. Kristie Nguyen

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 B Optom, FIAOMC

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 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

OD, MAT, FPCO, FIACLE, FAAO **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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Study Discovers OCT Efficacy in Uncovering Alzheimer's Disease

by Andrew Sweeney



f all the inequities, indignities and hardships life hoists upon us as we grow older, Alzheimer's disease (AD) is perhaps the most fearsome and well-known. The disease is silent, insidious and robs the patient of their identity and personality until all that remains is a shell. Despite its commonality, AD in many ways remains poorly understood.

For all our fears of dementia robbing us of our identities and memories as we grow older, AD is inevitable once detected, and treatment can only slow the progression of the disease. The disease is more than just a degeneration of the brain cells — it can affect multiple parts of the body in many ways. Early detection is crucial to slowing the progression of the disease, and this is where optometry and ophthalmology can play a pivotal role.

A disease of global proportions

According to the World Health Organization, 50 million people worldwide are currently living with dementia, of which 60-70% have AD. This number is expected to reach 82 million in 2030 and 152 million by 2050, the majority of which will be people residing in low to middle income countries. As you can imagine this entails significant cost, with the total global societal cost of dementia estimated to be U.S. \$818 billion in 2015, equivalent to 1.1% of global gross domestic product (GDP).¹

Of course age is the primary risk factor for AD, with the vast majority of cases occurring in people over 65. Other risk factors are less well understood, however a history of poor diet, smoking, lack of exercise and high blood pressure all have correlation with AD, among others. Symptoms are usually mild, almost unnoticeable in the early stages of AD, and include forgetfulness, poor judgement, shaky hands and difficulty with cognitive thinking.

The onset of symptoms usually occurs between 10 and 20 years after pathological changes begin to occur in the brain. Clearly, the ability to successfully identify these alterations to the brain before symptoms begin to manifest is an important area of study. Over the last five years research has identified several ocular biomarkers for neurodegenerative disease which puts the optometry community at centerstage in addressing the public health crisis of AD.

The window into a degenerated brain

Optical coherence tomography (OCT) is finding increased usage by researchers in their quest to find a non-invasive way to discover AD biomarkers. OCT is a non-invasive tool to measure specific retinal layers in the eye. As the retina is an extension of the central nervous system and shares similar structures and properties with our brain, the retina could mirror what is happening inside the brain, including the neurodegeneration caused by AD.²

Dr. Victor T.T. Chan is an ophthalmologist at the Hospital Authority in Hong Kong and is a research investigator at the Department of Ophthalmology and Visual Sciences at the Chinese University of Hong Kong. He is the lead author of *Spectral Domain-Optical Coherence Tomography Measurements in Alzheimer's Disease: A Systematic Review and Meta-analysis*, an overview of the potential of OCT in AD diagnosis. The doctor is enthusiastic about optometry's potential to find AD.

"Our research has shown that Alzheimer's disease is associated with thinning of the retina, including the retinal nerve fiber layer (RNFL) and the ganglion cell-inner plexiform layer. Consistently, two large-scale populationbased studies, the U.K. Biobank Study and the Rotterdam Study, also demonstrated that thinning of RNFL was associated with a significantly increased risk of developing both cognitive decline and AD," Dr. Chan said.

"OCT can be used in our community to identify individuals with changes in the retina associated with AD. This serves as a risk stratification tool as those individuals might have a high risk of AD and warrant early medical intervention with more advanced diagnostic imaging for the definite diagnosis of AD," he said.

Clearer pictures than ever before

According to the results of Dr. Chan's study there are associations between retinal measurements of SD-OCT, and AD, highlighting the potential utility of SD-OCT measurements as biomarkers



of AD. The potential in optometry in helping to mitigate the societal impact of AD is therefore profound, and in more than OCT technology alone. A number of other areas hold considerable potential as well.

Dr. Chan reports that work is ongoing to develop an artificial intelligence (AI) program that can automatically identify individuals with a high risk of developing dementia based on retinal images. AI technology holds considerable promise in revolutionizing swathes of ophthalmology and optometry. Some notable examples of this trend include diagnostic tools for diabetic retinopathy and improved fungal imaging.

Indeed, imaging is at the forefront of development in both optometry generally, and AD research specifically. Dr. Chan in particular reports he will continue to work on fundus photography as a risk stratification tool for AD. This is in addition to more developments specifically pertaining to OCT in the same area.

Fighting an insidious foe

"Another important development infield is the introduction of OCT angiography (OCTA). With this technology, we can now visualize the retina at the capillary level. The images can be assessed automatically using an advanced image analysis program, which generates a spectrum of parameters quantifying the health status of the retinal capillary network," Dr. Chan said. "Our research has also shown that Alzheimer's disease is associated with capillary changes in the retina, including decreased capillary network density and enlarged area deprived of capillary blood supply in the fovea," he said.

"We still only have very little understanding of this disease, hence I have a great interest in discovering new biomarkers that can identify individuals with AD at earlier stages of the disease and who are more likely to benefit from any effective treatments and lifestyle modification," he concluded. 😵

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Contributing Doctor



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Myopia Progression in Children Slowed with Use of Multifocals, Study Shows by Hazlin Hassan

ultifocal contact lenses (MFCLs), normally used in aging eyes, can slow the progression of myopia in children, according to results of the Bifocal Lenses In Nearsighted Kids (BLINK) study.*

"These lenses are believed to work by focusing some of the light directly on the retina, which enables children to see clearly, and focusing some of the light in front of the retina, which acts as a signal to slow eye growth," said BLINK study chair, Jeffrey J. Waline, OD, PhD, associate dean for research at the Ohio State University College of Optometry (USA).

"If the eye continues to grow at the normal rate when light focuses in front of the retina, then vision continues to get worse. Therefore, the eye slows its growth so vision doesn't get worse at the same rate," he added.

These results highlight the exciting discovery of the option to control the development of nearsightedness in children, a condition that can increase the risk of cataracts, glaucoma and retinal detachment later in life if left untreated. Slowing myopia progression could decrease the risk of these sightthreatening complications.

BLINK for children

Myopia is the most common ophthalmic condition in the world with an estimated 34% of the world population being affected. Half of the world's "If the eye continues to grow at the normal rate when light focuses in front of the retina, then vision continues to get worse. Therefore, the eye slows its growth so vision doesn't get worse at the same rate."

population is expected to be myopic by 2050, with 10% of the population being highly myopic.

If untreated, myopia can inhibit academic performance in children.



Visual impairment among preschool children is estimated to increase by 26% by 2060, with uncorrected refractive error comprising 69% of cases.

When a child has myopia, their eyeball is slightly longer than normal from front to back and images are focused at a point in front of the retina instead of directly on the retina. When this happens, objects at a distance seem blurry and unclear — and the higher the power added, the further in front of the retina the lens focuses peripheral light.

By comparison, single vision glasses and standard contact lenses, traditionally used to correct myopic vision, focus peripheral light to a point behind the retina, which encourages eyeball growth.

Several other advances in the treatment of nearsighted children include eye drops (such as atropine) which have previously been found to help slow the progression of myopia, but Dr. Walline said that multifocal contact lenses appear to provide better slowing of eyeball growth.

"While these contact lenses do not slow myopia progression, on average, as much as atropine eye drops, they do provide better slowing of eye growth (on average). Eye length is highly related to vision-threatening complications in adulthood, so that may be a very important factor when determining the best option for myopia control for young children," he explained.

The study examined whether high add power contact lenses provided better slowing of myopia progression and eye growth than medium add power contact lenses and single vision contact lenses.

Almost 300 myopic children, aged between 7 to 11 years old, took part in the study, conducted at Ohio State and the University of Houston, USA, and funded by the National Eye Institute, part of the National Institutes of Health.

At baseline, the children required -0.75 to -5.00 diopters of correction to achieve clear distance vision.

The children were randomly assigned to wear single vision contact lenses

or multifocal lenses, the outer lenses of which were either high add power (+2.50 diopters) or medium add power (+1.50 diopters).

The results? Children in the high add multifocal contact lens group saw the slowest progression in their myopia: Only the high add power contact lenses significantly reduced the rate of myopia progression over three years compared with medium add power multifocal and single vision contact lenses.

Mean myopia progression, as measured by changes in the eye prescription required to correct distance vision, was -0.60 diopters for the high-add group, -0.89 diopters for the mediumadd group, and -1.05 diopters for the single-vision group. The multifocal lenses also slowed eye growth.

The three-year adjusted eye growth was .42mm for the high add group, .58mm for the medium-add group, and .66mm for the single-vision group.

"When fitting soft multifocal contact lenses for myopia control, the strongest add power that provides children with clear vision ought to be used, and that add power is almost always the highest add power available (+2.50 diopters). Also, the parents of all myopic children should be educated about myopia control," noted Walline.

According to Walline, the contact lenses are safe to be used by children.

"Children have repeatedly been shown to be able to independently wear and care for soft contact lenses. In fact, they typically have fewer problems than college-age students. These lenses also provide clear vision and freedom from glasses, so the benefits outweigh the small risks that are associated with any contact lens wear," he said.

"This study shows that if fitting soft multifocal contact lenses for myopia control, optometrists ought to use the high-add power. Ultimately, this provides another option for myopia control in young children, and enforces the fact that parents of myopic children need to be educated about the benefits of myopia control," Dr. Walline concluded.

Walline JJ, Giannoni AG, Sinnott LT, et al. A Randomized Trial of Soft Multifocal Contact Lenses for Myopia Control: Baseline Data and Methods. Optom Vis Sci. 2017;94(9):856-866.





Jeepers Scooby

Myopia is Getting Managed Better than Ever Before _{by Andrew Sweeney}

"JINKIES, I CAN'T FIND MY GLASSES!"

o you remember that catchphrase from childhood? If you can't — or if you don't recognize it at all you're truly missing out on a classic.

Scooby Doo was a childhood staple for many of us — and the mystery-solving gang, including the eponymous dopey dog, offered a plethora of cathphrases to remember. "Jinkies" was the catchphrase of the bespectacled Velma, but throughout the show she also frequently lost her glasses, to the extent that "I can't find my glasses" became a catchphrase in its own right. Velma is one of the first cultural characters to suffer from myopia that many of us encountered in childhood.

The many multitudes of myopia

Myopia, is of course, one of the most pervasive conditions in eye care and its impact on society extends far beyond cartoons. Also known as shortsightedness, myopia is a refractive error — meaning that a myopic eye cannot bend light properly.

According to the American Association of Ophthalmology, over 25% of the U.S. population suffers from myopia, with onset usually presenting in children aged 8-12 years old.¹ Myopia is incredibly common in all parts of the world, and although it is a significant issue in the Americas, it is most noticeable in the Asia-Pacific region. Myopia is a pervasive and deeply ingrained disability in this part of the world. According to *The Epidemics of Myopia: Aetiology and Prevention*,² one of the foremost studies into myopia, the prevalence of myopia in young adults living in East and Southeast Asia was 90% — and high myopia has a prevalence rate of up to 20% in the same group. The risk factors include a high level of education and limited time spent outdoors. Causality has been demonstrated through randomized clinical trials in which increased time outdoors in schools has prevented the onset of myopia.

Make sure your kids spent time outdoors

The global presence of myopia is so expansive that experts view the condition as a societal problem, as much as a medical disease. While research continues into a potential cure, management and diagnosis are still the primary focus areas of most companies working in the optometry industry. Of these, perhaps the foremost is OCULUS Optikgeräte GmbH (Wetzlar, Germany).

With a history of more than 125 years in ophthalmological and optometry equipment, Oculus is one of the stalwarts of the industry. Based in Germany, the company has steadily expanded into the Asia-Pacific region over the last decade, putting myopia front-and-center as a priority. This development resulted in the creation of the Myopia Master.

Marketed as the first device to combine the important measurement parameters for making myopia management much easier, the Myopia Master promises to revolutionize patient outcomes and satisfaction. It can take risk factors



into account, like ethnicity, the number of myopic parents, as well as time spent with near-vision and outdoor activities — all of which influence the growth of the eye. The tool is a way to effectively combine measurement parameters with software that allows the optometrist to make data-driven decisions and evaluation-based action recommendations.

The "master of myopia"

"The Myopia Master is the most systematic way for me to manage myopia from the early stage. It has its science, technology and research based on the work of the Brien Holden Vision Institute. This is big data, which you can use to present parents with projections of how their children will see at age 18."

-Dr. Oliver Woo

The Myopia Master's implications for myopia and wider optometry have the potential to be remarkably significant, according to Dr. Oliver Woo. An optometrist with over 22 years of experience working in orthokeratology, Dr. Woo has been using the Myopia Master for the last five months and is highly enthusiastic about the device.

"The Myopia Master is the most systematic way for me to manage myopia from the early stage. It has its science, technology and research based on the work of the Brien Holden Vision Institute. This is big data, which you can use to present parents with projections of how their children will see at age 18," said Dr. Woo.

"It is an entire system we can use to present an accurate picture of a myopic patient's progression with the disease. Parents in particular are able to see their child's condition stabilizing, it's a really positive development to see," he said.

Current treatments for myopia, including the application of atropine can't be replaced by the Myopia Master, however they can be supplemented. High-dose atropine (0.5%-1%) is the most effective but it has significant side effects, such as photophobia and difficulty with near work (decreased accommodation). Low doses of atropine show a dose-dependent efficacy.³

Low dose cocktails and optimism

According to Dr. Woo, doses of between 0.01% to 0.05% of atropine have been used to effectively manage myopia without incurring significant side effects. Orthokeratology has also proven to be considerably effective in treating myopia, especially when combined with low doses of atropine. Prismatic bifocal lenses and specially designed multifocal soft contact lenses have recently been tested with promising results.⁴

It is this multi-focused approach to myopia management that Dr. Woo believes works best, describing it as a "cocktail." Combined with a management tool like the Myopia Master, Dr. Woo is optimistic that significant progress will be made in treating and mitigating the impact of myopia. He is also considerably positive

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about the role Oculus plays in its continued work in combating myopia.

"Oculus is invested in both the technology and science to develop the Myopia Master, as much as it was willing to collaborate with research centers. Looking forward, Oculus is creating educational tools for both optometry and ophthalmology on how to manage myopia in a more systematic, evidence-based and scientific way," Dr. Woo said.

"That's why I see the need to invest back into the industry, as well as looking forward to improving educational initiatives to train more optometrists and ophthalmologists to understand how to manage myopia," he concluded.

Contributing Doctor



Dr. Oliver Woo, B Optom, FIAOMC, graduated from 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

in 1997. In 2007, he became the first Australian fellow of International Academy of Orthokeratology (FIAO) and mentor. Dr. Woo has special interest 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 methods in myopic management.

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He served on the board of directors of 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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Therapies for Color Blindness Do they really work?

by Chow Ee-Tan

olor blindness, more accurately known as color vision defect, can be divided into two types – congenital color vision defects and acquired color vision defects. It is caused by abnormalities in the eye's three types of cone photoreceptors (anomalous trichromatism, dichromatism and monochromatism).

One Indian study found the prevalence of color vision deficiency in 2015 ranged from 5.26% to 11.36% among males and 0.00% to 3.03% among females of six different populations.¹ They have varying levels of color vision deficiency — from mild difficulty in distinguishing different colors, usually red and green, to a total lack of color vision.

Presently, there is no treatment or cure for congenital color deficiency, says Professor Dr. Sharanjeet Kaur Malkeet Singh, deputy chairman and graduate coordinator, Research Centre for Rehabilitation & Special Needs, Faculty of Health Sciences, Universiti Kebangsaan Malaysia (UKM).

As deficiency in color perception is due to the absence of cone pigments (in the case of dichromats) or different absorption properties of the cone pigments (as in the case of anomalous trichromats) in the retina, they cannot regenerate or be replaced, she said.

Gene therapy offers hope

"However, there is ongoing research in gene therapy that has promising outcomes, which could help convert color defectives to normal color perception," said Prof. Sharanjeet, adding that an initial trial with patients indicates that this new genetic treatment for complete color blindness is safe.

In about one-third of all patients with total color blindness, the defect lies in the CNGA3 gene, she says. A team from the Institute for Ophthalmic Research at the University Hospitals in Tübingen, and the Departments of Pharmacy and Ophthalmology at Ludwig Maximilian University (LMU) of Munich, has developed a treatment that should, in principle, correct this genetic defect.

"It involves introducing the normal version of the CNGA3 gene directly into the patient's retina with the aid of a harmless virus. After a few weeks, the retinal cells can express this functional version of the CNGA3 gene and are able to produce the intact form of the corresponding protein, which should restore the function of the defective cones," explained Prof. Sharanjeet. In this case, the healthy gene is transported by an adeno-associated virus developed by Professors Stylianos Michalakis and Martin Biel at LMU.

The first clinical study of this approach, which involved nine achromatopsia patients aged between 24 and 59 years, has been completed at the University Eye Hospital Tübingen and its results appeared in the *JAMA Ophthalmology.*² The patients' visual function improved, both in terms of visual acuity and in relation to contrast and color vision, and without their retinas showing any permanent changes.

Lenses for color vision

What about lenses for the color blind? Prof. Sharanjeet says there are some lenses available that might help color defectives to distinguish between some color combinations in certain situations, while others report no benefit or cause further confusion.

There are both active and passive tools that aid people with color vision deficiency. The active tools help color vision deficiency observers in their daily life as they change the appearance of the objects (by recoloring images) through image processing algorithms. This increases the contrast between colors that are indistinguishable for the user.³

"These solutions require a display to show the image to the subject, such as, for example, prototypes of smart glasses. However, this results in a decrease of naturalness," she noted.



The passive tools are colored filters or tinted lenses, which have recently received increased interest.

"In the 1960s, two companies exploited the original idea of Seebeck (1837) and introduced a lens that just filters one eye (usually the non-dominant eye) for people exhibiting deuteranomalous color vision. The X-Chrom Color **Deficiency Contact Lens and** ChromaGen Lenses for Color Blindness and Dyslexia are still available on the market today.

"In 2008, X-Chrom was rebranded to Zeltzer X-Chrom. While the X-Chrom tinted lens covers the iris and the pupil, ChromaGen tinted lenses only cover the pupil," continued Prof. Sharanjeet.

She says analysis has been done on X-Chrom and ChromaGen contact lenses, and report improvement, as well as worsening on some color vision tests.

"As such, their use can be dangerous for activities such as driving and flying at low light levels, when visual acuity is reduced. It can result in distortions of apparent velocity, visual distortions and impairment of depth perception. The studies conclude that these lenses do not provide a true color hue perception," she said.

Recently, other companies have marketed glasses with color filters for both eyes, among them EnChroma (Calif., USA) and VINO Optics (St. Thomas, Virgin Islands). Some research has suggested that EnChroma lenses neither improve results in the color vision tests nor allows the color defective individuals to have a more normal color perception.4-5

Meanwhile, VINO glasses were initially designed to enhance the O2 signal from hemoglobin under the skin, but the inventors claim that their technology "aids red-green deficiency," said Prof. Sharanjeet. Some research has suggested that contrary to EnChroma glasses, VINO glasses improved discrimination for red-green, but only in green defective individuals.5-6

The study by Mastey et al., claimed that colored filters can introduce sufficient luminance or brightness cues that allow individuals with color defective vision

to "cheat" on color tests. Mastey also concluded that color vision defective individuals cannot "see new colors" either with VINO or EnChroma glasses.⁵

"From the literature, it appears that EnChroma lenses do not provide any benefit to color vision defects. However, evidence shows that VINO lenses may be helpful to some individuals with a green color vision deficiency," says Prof. Sharanjeet.

She says most lenses seek to improve the vision of color-deficient observers by principally modifying the illuminant, but are largely ineffective in enhancing discrimination or perception because they do not sufficiently change the relative activity of the red and green photoreceptors.7-8

However, a new study found that special patented glasses engineered with technically advanced spectral notch filters enhance color vision for those with the most common types of red-green color vision deficiency (anomalous trichromacy).⁹

The absorption spectra of EnChroma lenses and red and green pigment are very close. In anomalous trichromats, the red pigment and green pigment have very similar absorption characteristics. EnChroma lenses separate the transmission of wavelength (color) to below 600nm and above 600nm. This feature might increase the difference of anomalous red and greencone signals.

"The study does not clearly state how the chromatic contrast responses were determined, but there was an increase in color contrast with long-term usage of these filters, which may have reduced the overlap in stimulation of the cone sensitivities.

"The contrast response enhancements generated by the filters may have led the observers to become more aware of weak perceptual signals and, thus, to have learned to be more attentive to them," says Prof. Sharanjeet, who notes that the study was done on a small sample size and therefore its outcome is limited. 🕹

Contributing Doctor



Prof. Dr. Sharanjeet Kaur Malkeet

Prof. Dr. Sharanjeet Kaur Malkeet Singh is deputy chair for iCaRehab and postgraduate coordinator; and a professor and lecturer in Universiti Kebangsaan Malaysia (UKM). She completed her Bachelor of Optometry (Hons) in 1986 at UKM and Ph.D. at University of Manchester Institute of Science and Technology (UMIST) in the United Kingdom in1991. Her Ph.D. was on color percention and her main areas

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Sustainability and Coronavirus Dominate Discussion Among Optometry's Next Generation by Andrew Sweeney

here is an old adage about what is required to be a gentleman: "Manners maketh the man." If you suffer from poor vision and require the use of eyeglasses, then you will know a similar adage also holds true this is that "glasses maketh the man (or woman)," and that getting the right pair of glasses matters.

For those of us who wear them, spectacles are glued to our faces all day and accompany us throughout almost every aspect of our lives, except perhaps, for sleeping. Despite prognostications of their imminent demise — especially with the increase in use of contact lenses — eyeglasses are resolutely here to stay. They will remain an integral part of the eye care industry, thus getting the right pair for the right customer will always be of paramount concern.

Getting the right frames for the right face

Certainly, it has become far easier to get the right pair of spectacles for the "right face" over the last decade. When your correspondent started wearing glasses at the age of 7, the options offered by his country's national health service were fairly limited. It was expected that you would like round and brown, for that was pretty much your only option.

Fast-forward to 2018 and my last eye test — yes, I know I'm overdue... apologies to Specsavers Glasgow but there is something of a pandemic going on and options for the glasseswearer abound. Every time one goes for a test it seems as if there are more frames, lenses and styles to choose from than ever before. It is also easier to find the right frame for the right face as opticians increasingly use facial recognition technology to make frames to fit faces virtually.

So, the questions on everyone's mind should be: What's coming next in eyewear; and what can the new generation offer to patients and clinicians alike? That was the hot topic of discussion during Vision Expo's online symposium entitled *Virtual EYE2EYE Series: Coffee Talk* — *The Next Generation of Eyewear.* Held last June (entirely online of course), the seminar was one of many, described as a "complimentary series of virtual panels and interactive conversations inspired by Vision Expo's EYE2EYE educational series."

Participants during Coffee Talk — The Next Generation of Eyewear's



webinar offered the best advice and insight for optometrists, as well as the latest creative movements in the eyewear industry. The session was chaired by Tarrence Lackran, a.k.a. @TheOpticalPoet (on Instagram), and the director of partnerships and programming at The Vision Council. Lackran is an eyewear ambassador and a social media influencer.

Lackran was joined by four main pannelists: Kyly Zakheim-Rabin, owner of Zak; Wes Stoody, founder and CEO at Article One; Ahlem Mani-Platt, founder and designer at Ahlem Eyewear; and Christos Karabelas, owner at SOMA Optical. All young opti-entrepreneurs, representing both the vendor and retail aspects of the eyewear business, talked about their creations, innovations, inspirations, and how retailers and vendors can support one another during the ongoing coronavirus pandemic.

Focusing on creating a sustainable environment for clinician and customer

The seminar began with a round of introductions from all the participants. Some, like Mani-Platt, had no familiaal background in optometry, whereas for other participants there was a clear family heritage in the business. Mani-Platt used this section to speak about the importance of sustainability in Eye. The impact of social distancing rules is being felt across optometry. eyewear, and how she couldn't sleep

"If someone says their glasses are made from bottles from the beach that's great, but that's not sustainable. You're green, you're trying to clean the world, but you're not sustainable, this is a human factor and it's about how your team works," Mani-Platt said.

As companies move to secure their sustainability, more of them are moving to online only operations. Karabelas discussed his experience moving more into online sales, embracing social distancing conditions and altering his company's working practices. He has adjusted his customers' eyeglasses in his own car, and rerouted his company's phone number to his cell phone.

Stoody echoed these comments, pointing out that at his company there is no pressure on the employers to work from the office. Conversely, customers are no longer able to randomly visit stores in many cases. Mani-Platt used the analogy of the personal shopper, and how providing a more tailor-made experience for the customer can help improve their experience, while also ensuring social distancing compliance.

Community relations and the correct use of social media also dominated toward the latter part of the webinar. The participants broadly agreed that a positive aspect of the coronavirus pandemic was that it enabled them to improve their e-commerce and social media platforms. There is also improved connectivity within their own companies, as well as the communities they serve.

Emphasizing the link between community, customer and clinician

"Millennials are taking eyewear to another level, we are all excited about the direction in which it is going," said Lackran.

"Some of my favorites, the legends and pioneers in the industry, have set the tone and cleared a path for the next generation of eyewear. These four vendors [from the main panel] and retailers represent that next generation," Lackran added.

The Virtual EYE2EYE Series holds a seminar every Wednesday and can be accessed from the platform's own website or on its YouTube page. The series is produced by Reed Exhibitions and supports the American Optometric Association's Think About Your Eves Campaign. 🕹

Editor's Note:

Eyewear Designers Remain Optimistic Despite Coronavirus

by Andrew Sweeney



oronavirus has changed many aspects of ophthalmology and optometry, some of which are more obvious than others. Visits to clinics have been significantly curtailed, tens of thousands of surgeries across the world remain on hold, and distanced medicine (or telemedicine) has become far more prominent. With the latter development in particular, one must consider the full impact of coronavirus on eyewear too.

Eyewear, as an industry, has been significantly affected by the coronavirus in ways that are obvious, and some less so. The impact of social distancing on the ability of optometrists to test their patients' eyes is widely reported, but the pandemic's impact on eye manufacturing, for example, is a less well-known issue. Given that many countries are now experiencing a second wave of the virus, understanding the full impact on eyewear is an important issue.

The future's in the glasses

Over the last year, Vision Expo, an organizer of conferences pertaining to eyewear and optometry, has been running a series of online webinars which cover the many aspects of the optometric industry. Inspired by Vision Expo's education-based webinars, the Virtual Eye2Eye series occurs every Wednesday. Each webinar is on average 1-1.5 hours, and offers a spotlight on the state of optometry.

Earlier this year, on May 29, Vision Expo held *edCFDA: What is The Future of Eyewear + Design?* (The acronym edCFDA stands for eyewear designers of the Council of Fashion Designers of America.) The webinar featured discussion on how the coronavirus pandemic has changed the eyewear landscape and how elements such as concept, design, engineering, manufacturing, price point and even marketing, will shift and change as consumer preferences are reshaped. The discussion also considered the ongoing viability of the luxury eyewear market as the world moves through the challenges of 2020, and how luxury and high-end eyewear design, price level and availability may change as a result.

A who's who in eyewear

The symposium was chaired by Erinn Morgan, an eyewear industry expert and editor-in-chief and editorial director of *Eyewear Business*. The were four main participants, including Selima Salaun, the founder of the luxury eyewear brand Selima Optique; and Blake Kuwahara, the creative director of his eponymous eyewear company. Kuwahara is also the founder of Focus Group West, a design collective uniting eyewear designers, architects, managers and others working in the eyewear industry.

They were joined by Gai Gherardi, the co-founder and designer of I.a.Eyeworks, an international eyewear company; and Ahlem Manai-Platt, the award-winning founder of the luxury



eyewear brand AHLEM. All of the participants interacted with others in a positive manner, and there was a clear spirit of solidarity in the face of coronavirus. Gherardi began the session by reminding the participants of previous difficult times, having opened her first business during the economic slump of 1979.

Travel no more

Kuwahara discussed the importance of international shows to his own business, and how the lack of international events has significantly impacted operations. He spoke about the importance of adaptability during the coronavirus pandemic and postponing launches when necessary. However, the stability of optometry was also referenced.

"We straddle both the medical and the fashion worlds, and even at the optician side we're used to the highest standards of hygiene, so we were better prepared than most retailers for coronavirus," Kuwahara said.

"We have to continue to produce, you cannot say to a factory that we'll stop production and not pay them for six months, you have to move forward. The relationship you have with your wholesaler makes all the difference," Manai-Platt added, following Kuwahara's comments.

Finding optimism in sustainability

There is optimism to be had in the eyewear industry, despite the shock caused by coronavirus. The participants agreed on that, but also considered that this requires considerable adaptability. As people become comfortable with the coronavirus "new normal," the behaviors they adopted during the pandemic will likely become permanent. This means e-commerce will become even more prevalent, and home visits for testing will become more common.

Quality rather than quantity, and brand sustainability, will become crucial for eyewear businesses to survive. There was considerable discussion among the panelists about how companies can better innovate to survive. For Gherardi, the current climate requires both determination and ingenuity.

"We are going to have to prove ourselves again, as coronavirus is going to be a real reset, if I can deliver a customer a frame to try, and we can talk about



it over the phone, that is fantastic," Gherardi said.

PPE and perfect fashion

Design would perhaps be the most obvious way eyewear will change due to coronavirus. People wearing eyeshields and other aspects of PPE are influencing eyewear, a point that Salaun was keen to mention, and she argued that this will have a considerable impact on design. This goes beyond purely aesthetic considerations, pointing to her own experience of contracting conjunctivitis.

On the other hand, Ahlem-Patt, while echoing Salaun's comments about changing designs, described her company's products as being like a family heirloom. She views her glasses as items that could be passed down from grandfather to grandson. She emphasized her commitment to continuing her activity as normal and focusing on quality.

"In the optical industry we have a wonderful community, we know the transformation eyewear can express, it's heartwarming and I think we'll make good choices for our industry," Gherardi said, summing up the symposium.

The Virtual EYE2EYE Series holds a seminar every Wednesday and can be accessed from the platform's own website or on its YouTube page. The series is produced by Reed Exhibitions and supports the American Optometric Association's Think About Your Eyes Campaign.

Editor's Note:

Vision Expo's Virtual EYE2EYE Series: edCFDA: What is The Future of Eyewear + Design? webinar took place on May 29, 2020. Reporting for this story also took place during the webinar.



The Disparity and Future of Eye Care in Asia-Pacific

by Brooke Herron

In this first issue of COOKIE, our cover story takes a look at the imbalance in access to eye care in Asia-Pacific, as well as future considerations for improvement. COOKIE magazine is designed to help increase optometric and optical awareness and education worldwide, with a special focus on countries in the Asia-Pacific region.

round the world, there are major inequalities when it comes to access to vision and eye care. This tends to affect the lower-income, or more rural regions disproportionately, where access to simple vision screening and spectacles can be cost-prohibitive, leading to higher rates of myopia and presbyopia. Meanwhile in higherincome countries around the world, the more likely causes are age-related, like cataract and agerelated macular degeneration (AMD).

According to the World Health Organization's (WHO) World Report on Vision,¹ there are 2.2 billion people with visual impairment globally — and at least 1 billion of those cases could have been prevented, or have yet to be treated. Unaddressed presbyopia (826 million) and uncorrected refractive error (123.7 million) are the most common cause of preventable blindness worldwide. On further investigation,



countries in Asia-Pacific own a disproportionate share of the burden.

The WHO report stated: "The economic burden of uncorrected myopia in the regions of East Asia, South Asia and Southeast Asia were reported to be more than twice that of other regions — and equivalent to more than 1% of gross domestic product." This illustrates widespread visual disability in the region, which is also associated with decreased productivity and quality of life (QoL).

> However, lack of access to

care isn't the only problem in Asia-Pacific — in fact, the prevalence of myopia is the highest in high-income countries in the region (53.4%). For example, in-country numbers among adolescents in urban China and South Korea are quite startling, with myopia rates of 67% and 97%, respectively.¹

In addition, low vision that cannot be corrected with spectacles, contact lenses or laser surgery is also comparatively higher in lower income countries in Asia-Pacific.²

Therefore, in the premiere *COOKIE* cover story, we take a look at disparities and barriers to eye care in Asia-Pacific, with insight from an Asia-based optometrist on how to improve access — and thus, improve vision — in the region.

The imbalance is great

Back at Asia-Pacific Academy of Ophthalmology (APAO) congress in

2017, Dr. Taraprasad Das (India) presented the Holmes Lecture, titled: *Blindness and Visual Impairment Profile and Rapid Assessment of Avoidable Blindness (RAAB) in Southeast Asia: Analysis of New Data.*³ What he revealed was very telling of the situation on the ground in Southeast Asia — and is still relative today in 2020.

The International Agency for Prevention of Blindness (IAPB) includes 11 countries in its Southeast Asia region (SEAR) — in this region, 12 million are blind and 78.5 million are visually impaired; this amounts to 30% of global blindness and 32% of global visual impairment, according to Dr. Das.

His analysis included moderate to severe vision impairment (MSVI) and blindness from eight SEAR countries: Bangladesh, Bhutan, India, Indonesia, Maldives, Sri Lanka, Thailand and Timor Leste. Not included were Myanmar, Nepal and North Korea.

In all eight countries, cataract was the

Representing **51%** of the world's population, three regions in Asia account for **62%** of the estimated **216.6** million people in the world with moderate and severe bilateral presenting distance vision impairment.¹



61.2M South Asia

52.9M East Asia

20.8M Southeast Asia



primary cause of blindness (presenting visual acuity (PVA) worse than 3/60) and severe visual impairment (PVA worse than 6/60). However, in four countries, uncorrected refractive error (URE) was the primary cause for moderate vision impairment (PVA worse than 6/18): Sri Lanka (64%); Bangladesh (63.6%); Maldives (50.9%); and India (32.9%). And although cataract is the main cause of moderate visual impairment in Bhutan, Indonesia, Thailand and Timor Leste, the rates of impairment from URE are still concerning at 34.7%, 36.8%, 26.7% and 32.2%, respectively.

URE also accounts for higher levels of severe impairment in Sri Lanka (46.7%) and Thailand (26.7%). In addition, URE accounts for 12.5% of blindness in Sri Lanka. Although these statistics are unsettling, there is a bit of good news: Progress is slowly being made. The RAAB survey noted that the prevalence of both blindness and MSVI has reduced from 1990 in [the region], though it was higher than the world average, according to Dr. Das.

Among the barriers noted, accessibility was the biggest hurdle in Maldives and Timor Leste. In Sri Lanka, the primary barrier was cost.

"In addition to accessibility and expenses, we identified two further barriers to effective eye care delivery in the Southeast Asian region in an earlier publication; they were lack of human resources and the urban centric distribution of eye care personnel," said Dr. Das.

To address accessibility, Dr. Das said points of care could be placed "as close as possible to people through the eye health pyramidal system of service delivery." Further, expenses could be met either by national eye care subsidies or appropriate health insurance, he continued.

"However, the key will always remain in human resources and equitable distribution of skilled eye health personnel," shared Dr. Das. "We strongly believe that training and deployment of allied eye health personnel hold the key to reduction of preventable blindness."

Spotlight on the Philippines

The top reason for blindness in the Philippines is cataract: "People don't have access to eye care and/or they don't have money to visit the doctor. Cataract is still the number one cause of preventable, avoidable blindness in the Philippines," said Dr. Carmen Abesamis-Dichoso, a self-employed optometrist in private practice at Medical Plaza Makati and a *COOKIE* advisory board member.

The second is URE. She says many people in the Philippines can't afford to buy eyeglasses, which cost about US\$4. "They don't have glasses because they don't have food on the table. Eyeglasses are a luxury for them."

Myopia is also on the rise due to changes in lifestyle, especially among those in urban areas. "About 52% of the population in the Philippines is potentially myopic . . .

Major inequalities in eye care remain in Asia-Pacific. everyone is taking online classes and working online — and this is adding to the risk," she said. "Myopia is the other pandemic."

And while the Philippines enjoys the longest history in optometry in the Asia-Pacific region, with its first law enacted in 1917, this nation of more than 7,000 islands has issues with accessibility.

In the Philippines, distance to vision services is the biggest barrier, according to Dr. Abesamis-Dichoso: "It's very dispersed, so it's not balanced when it comes to accessibility or availability.

"People from far-fetched islands, they have to take a boat, a land trip and then another boat, just to get to the city and that's very challenging to them," she continued.

Another issue is economics — for both physicians and patients. "Optometrists and ophthalmologists are more attracted to practicing in the cities you would rarely see an optometrist or ophthalmologist going to those provinces," said Dr. Abesamis-Dichoso, adding the reason for this is that there isn't the same earning capacity in the remote villages and islands.

Further, Dr. Abesamis-Dichoso says that many Filipino optometrists are working overseas: "Compared to the rest of Asia-Pacfic, we are very much ahead in terms of education. About 70-80% of optometrists working in the Middle East are Filipino," she explained, adding that Singapore also employs many Filipino optometrists. "They have a very high prevalence of myopia — up to 80% — but they don't' have a lot of optometrists."

On the plus side

Although challenges remain, there are philanthropic groups — as well as

Eye glasses not only improve sight, but also drastically improve quality of life.

dedicated volunteers — who are helping to lessen the burden and alleviate some of the region's preventable blindness.

One such example is the Fred Hollows Foundation, an international development organization whose purpose is to make sure everyone whether they're rich or poor — has access to high quality, affordable eye health care. The Foundation's work continues the mission of Prof. Fred Hollows, whose vision was to end avoidable blindness.

According to Dr. Abesamis-Dichoso, the Foundation identified six areas in the Philippines and "put up" eye centers there. "There are volunteer optometrists and ophthalmologists who visit the eye center — and it's attached to a hospital. This means that at least three to four times per week there is access to eye care in some provinces. There are three in Luzon, but I don't think there are any in Manila yet," she shared.

The Philippine government has also been active in this regard, by promoting vision screening, teaching health workers to perform vision screenings, and focusing on education.

Charitable organizations, along with continued education and awareness of preventable blindness, will certainly help make strides to eradicate vision impairment in the region. Improvements have already been made. and with the combined efforts and commitment from those in the industry and beyond, more and more people will finally have access to eye care in Asia-Pacific and around the world. 🙆

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Contributing Doctor

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.

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Protecting Sight in Some of Asia's Poorest Communities by Hazlin Hassan

A n estimated 2.2 billion people worldwide suffer from visual impairment of some kind. Almost half of this is preventable or treatable, but some communities simply do not have access to the eye care they need.

Here, we take a look at two organizations making an impact by delivering eye care to some of Asia's poorest communities.

Brien Holden Foundation

The Australia-based Brien Holden Foundation works with local partners in developing communities to build sustainable eye care systems and ensure that residents receive the eye care they need.

One of their projects is in Cambodia.

"We reached a good progression recently through our continued advocacy for eye health care to be added into the National School Health policy, which essentially denotes the care parameters for the children of Cambodia," said Selina Madeleine, director of Brien Holden Foundation.

"Child eye health has now been ratified by the government to be included in the policy. We are currently in discussions to assist in the development of the supporting curriculum for the policy inclusion," she added.

While Cambodia has recovered since the civil war and is now a rapidly developing Southeast Asian nation, access to quality health care remains a challenge thanks to cost and inequality.

A vision center set up by the Foundation in Phnom Penh in 2009 contributes to the elimination of uncorrected refractive error by providing the community with access to eye examinations, affordable prescription glasses and referrals.



In the last five years, it has worked in collaboration with the Cambodian Ministry of Education, Youth and Sport, the Australian government and international NGOs, to implement eye health care education programs for students at primary schools in five provinces.

Healthy vision is critical to childhood development, and screening children for eye disease is crucial because the damage caused to young eyes can have lifelong impacts.

Research in 2010 found that over 80% of vision impairment in children across Cambodia was due to uncorrected refractive error.

The Phnom Penh Vision Centre has screened and examined over 65,000 people and delivered over 21,000 spectacles to local beneficiaries. Cambodia has 77 ophthalmologists for a population of 15 million, and according to the Brien Holden Foundation, there are no locally-trained optometrists.

The foundation trains refraction nurses and spectacle technicians at its National Refraction Training Centre, among other efforts.

Sightsavers

Sightsavers is dedicated to combating avoidable blindness and promoting equal opportunities, providing eye operations for people who need them, and training eye care workers and surgeons.

Through community volunteers, it also distributes medication to people in some of the world's poorest countries.

Some of the eye conditions which it treats and prevents include cataracts, which can lead to blindness if left untreated.

Last year, 403,000 cataract operations were supported by Sightsavers, which aims to make it easier for people to be treated for cataracts, especially in poorer countries where surgery is not always readily available.

It also aims to improve the quality of cataract surgery and increase the

number of operations performed by increasing the number of surgeons, nurses and community workers trained in eye health, as well as educating people about cataracts and explaining where to get treatment.

Since it was set up in 1950, Sightsavers has helped to carry out 7.7 million cataract operations in poorer countries, and trained more than 1,000 surgeons.

One of the many people who have benefited from Sightsavers' work is 55-year-old Zamurrad, from Rawalpindi in northern Pakistan, who lost her sight to cataracts.

When Zamurrad developed cataracts, her vision deteriorated and she struggled to do anything for herself or her family and she was scared to leave the house. One day, she heard that operations were available for free at a Sightsavers partner hospital, and the rest is history.

"When I was not well and I had this cataract, my husband used to do everything for me," she said a year after her surgery.

"I can see everything clearly: I'm very happy and I do all my household chores now," she added.

The charity also treats refractive errors, which can be particularly problematic in developing countries, where those affected may not be able to afford or have access to sight tests or spectacles to help improve their vision.

In February this year, the foundation set up a one-day eye screening camp in Rangpur, Bangladesh, for the Bihari community, a minority group of people who have experienced discrimination and lacked access to essential services since they fled violence in India in the 1940s to live in Bangladesh.

Patients diagnosed with cataracts were referred for a free cataract operation. If a patient needed glasses, or a new prescription, they were prescribed glasses or eye drops.

A total of 321 adults and children attended the camp. Seventy-five were given eye drops, 57 needed cataract operations, 52 had their glasses checked, and 29 received pairs of glasses.

Hasina, who attended the one-day camp, was diagnosed with cataracts. She was referred for surgery at the Community Eye Care and Research (CERC) hospital in Rangpur. According to Sightsavers, Hasina has since had her second eye operation and is doing well.

Since 2004, Sightsavers has dispensed 4.6 million pairs of spectacles across Africa, Asia and the Caribbean as part of efforts to boost universal eye care.

It has also helped to train 732 optometrists and 433 optometric technicians, who are able to carry out sight tests, diagnose eye problems and help to treat people with low vision in some of the poorest parts of the world, who may otherwise not have access to eye care.

Sightsavers' School Health Integrated Programming (SHIP) project, which ran throughout 2016, also screened schoolchildren in Cambodia, Ethiopia, Ghana and Senegal for health problems such as poor eyesight.

Teachers were trained to carry out basic eye tests and refer children for further treatment. During the project, 57,400 children were screened for eye problems and 1,000 were given spectacles.

Together, through efforts like those from the Brien Holden Foundation and Sightsavers, we can hope to make a visible impact on those who need it most.



Photo provided by the Brien Holden Foundation on their work in Cambodia.



Optical's Most Influential Women On Leadership, COVID-19 and Community by Chow Ee-Tan

"We

our of Vision Monday's "2020 Most Influential Women in Optical" honorees were featured on the Virtual EYE2EYE Series, a complimentary program of virtual panels and interactive conversations inspired by Vision Expo's EYE2EYE educational series.

Moderated by Marge Axelrad, senior vice president and editorial director at Vision Monday (VM), the webinar's panelists were considered this year's rising stars, innovators and modern mentors. They shared their views on the future of vision care, career goals and what they believe are the priorities for young female leaders.

Introducing the honorees

Mollie Tavel Kaback is the director of growth initiatives and community engagement at Dr. Tavel Family Eye Care in Indiana (USA), a third generation, family-run business. She focuses on growth of the company, from technology to community relations.

"I'm the only female on the leadership team. Our family members all have different backgrounds and experience in the industry, and in managing a crisis," she said, adding that she's met many women who were adept in managing crises.

Camille Cohen, an optometrist at Pearle Vision in New York City, earned her Doctorate in Optometry from Salus University before joining her brother as a business partner. She admitted that it was not easy being in a position with employees who are older and more experienced than her. have more women in leadership positions, but from my personal experience, very often people assume that I'm a technician or a nurse. Sometimes it's well-received, but sometimes our authority and experience are questioned.

"It helps to have a network of strong women around me, who can step in and give me support," she said.

Brooke Hargrove, co-owner of Empire Optical in Tulsa, Oklahoma (USA), worked as a nurse before setting up the optical store with her husband last year. She was well aware of the anxiety and worries caused by the pandemic, and took steps to manage them by talking to employees, as well as with customers, to keep their emotions calm.

The fourth panelist, Leigh Berberian, is director of marketing at Todd Rogers Eyewear (Massachusetts, USA). Joking that she married into the business, she explained that her husband is the founder of the company. "I am trying to maintain optimism in my own ways. We always base our brand on 'feel-good' things. I have been trying to reach out and to connect with others, staying true to the hope that everything will be okay," she said.

COVID-19 impacts in optical

The panelists discussed how women in leadership roles can contribute to the optical industry during the pandemic, and further, the changes the industry needs to undertake.

The common understanding is that there is a new level of doing things remotely. There are enhanced safety



measures in place to protect against COVID-19, and visits to opticians are through appointments only. Hygiene has also been heightened across the board.

Kaback said that staffing became more predictable once they realized that certain aspects of the business could be done from home, such as billing or managing the retail operation.

The panel agreed that today, there are numerous opportunities for suppliers, vendors and eye care partners to facilitate interaction and conversation in the community.

"For example, if you're supplying face masks to local schools, you have the opportunity to introduce your local eye care provider to their service and resources," said Kaback. "We have been trying to get inroads to the school partners and reaching out to parents who are watching their kids."

Supporting the local community

Indeed, community support is of great need and importance. Optical companies should ask what they can do to help via products and services which will also be helpful to the growth of their businesses.

For example, Dr. Cohen is working with the National Optometric Association (NOA) on a program to provide free eye care and eyewear to minority communities. She has been active in the NOA, which was founded in 1969, and has served as director of communications and editor of the organization's magazine.

"Education is important," she stressed. "I see how desperate a family can be when they don't have a laptop, and thus, no access. I believe providing eye care and eyewear to those in need is important for the generation that is coming up," she added.

Kaback, who has personal experience with the help and support of other women leaders, shared about her "boomerang" work life. After leaving her family's business, she began her own journey in the healthcare industry in public relations, where she worked with great female mentors for three years.

"These are women who wanted to support other up-and-coming women. And from them, I saw successful family relationships and other business opportunities. That was when I considered coming back to my family business — and now I look at the industry from a different point-of-view," she said.

Kaback met a group of Transitions Change Agents and was encouraged by the fact that many industries are filled with people who want to help others.

"Among them are some incredibly smart and inspiring women leaders in the optical industry, and they have guided me along," she enthused.

The bright future of women in optical

So, what are the important things that today's women — with an entrepreneurial mindset — can contribute to the industry? Having a common voice is important, according to Berberian.

"Americans don't really understand who opticians are and what they do. Now we have a golden opportunity in marketing: To find an optical community and to hit that point home.

"Instead of looking at one another as competitors, we should find a commonality, a common voice. This can help move each other forward. It also gives the public a better, and healthier, understanding of how they choose eyewear and why they go for eye care. We have not done a good job, and now is the time," added Berberian.

Hargrove, who is a mother of three, said she is always intentional when it comes to hiring women with families — and in turn, helping them navigate their careers.

"We should be more understanding of people, especially at this time. We need to have more patience. Women should empower each other more than judging," she said.

Kaback agreed that it is important to

support each other during this time, and one way to do that is through pricing. She disclosed that her company offers a program that converts payments into installments for their customers.

To Dr. Cohen, public health education is vital to emphasize why the eye care and eyewear industry are important.

"Today more people have binocular vision problems, and also follow-up with glaucoma care. And if you have a family history of diabetes, hypertension and high cholesterol, it can affect your eyes. But, we must stress the importance of an annual eye examination. With that, not only you are preserving your life, but also your sight as well," she said.

Compared to the past, there are fewer barriers and a lot more opportunities for women leaders in the optical industry. But there is still a lot of work to do.

On influencing more young black women to go into the eye care profession, Dr. Cohen said visibility is key for people to see the opportunity. Black Americans comprise 13 percent of the population, but only occupy 3 percent of the optical profession.

The NOA's "Vision in the Future" program seeks to provide a scholarship and mentorship pathway to historically black colleges and universities. The first round of recipients were awarded this year to four young women, said Dr. Cohen.

She is challenged to take on a mentorship role in the education of young students, so that their families are also educated on all the opportunities available to them. ③

Editor's Note:

Vision Expo's Virtual EYE2EYE Series: "Listen In to Tomorrow! A Conversation with Four of VM's 2020 Most Influential Women in Optical" webinar took place on August 12, 2020. Reporting for this story also took place during the webinar.



New Transmitter Device Enables Patients to Monitor IOP by Andrew Sweeney



A ccording to entrepreneur and potential James Bond Villain Elon Musk, you are already a cyborg . . . have you not noticed? Granted you might not have cables and computers installed directly into your brain, but you do have a powerful device attached to your hand. Smartphones, for many of us, govern almost every aspect of our life.

This is not usually what people have in mind when they think of cyborgs, preferring to fall back on science fiction characters like Darth Vader. Musk raises an interesting point however: We are so dependent on technology that we are in many ways cyborg in nature. Whether or not that is unsettling is beside the point, and cyborg-eque devices are becoming big business.

You are not a robot ... but we are getting closer

This is especially true in the biomedical sphere, where developments like implants, mobile apps and wearable devices are revolutionizing patient treatment and management. Items like Fitbits have been around for a few years and they are considerably improving in quality and efficacy. Implants represent the most exciting aspect of this development and also hold the greatest promise for the optometry industry.

Some might say that contact lenses are the original implants, despite their temporary character. Now, of course, we are more familiar with eyelid and corneal implants, bio-integrations and prosthetic eyes, as well as glaucoma drainage implants designed to improve aqueous flow. Indeed, while many eye conditions are now being treated or managed with implants, glaucoma stands out as a particularly promising field.

Glaucoma is characterized by a high level of intraocular pressure (IOP) and although it's not the sole cause of the condition, it is a significant risk factor. The ability to mitigate and manage IOP in high-risk patients is therefore important, especially as glaucoma is one of the leading causes of blindness in the world. A group of researchers at Purdue University in West Lafayette, Indiana, USA, recently announced a significant development in this area.

A group of four researchers from the University's electrical and computer engineering department have developed a 2.4GHz ultra-low power, energyharvested narrowband transmitter (TX) for wireless sensing and biomedical devices. It's certainly a bit of a mouthful, but the transmitter deceive represents a remarkable achievement.

The TX comprises a voltage-controlled power oscillator (VCPO) and a loop antenna which is patterned over a flexible Parylene C substrate (which is a polymer) to achieve biocompatibility with the patient. The loop antenna acts as a radiator, as well as an inductive element for the VCPO, eliminating the power amplifier stage and bulky off-chip matching network.

Basically, what this all means is that the transmitter is designed for low-active and sleep-mode power consumption to support both continuous-data mode or deeply duty cycled burst-data mode of transmission. In even more layman's terms, this means that data can be collected while the patient sleeps. This makes measuring medical issues like IOP much easier and more efficient.

Empowering patients to take control of their IOP

Hansraj Bhamra, PhD, was one of the lead researchers on the device while he was a graduate student at Purdue. He received his doctorate in electrical and computer engineering and went on to work at Apple and Broadcom Limited. Beyond the academic challenge, his motivation was also to help assist amputees and people living with glaucoma, which accounts for the broad applicability of the implant.

"The transmitter can be integrated with a wide number of biomedical systems and can also enable the wireless transmission of data, just like WiFi. One area which is specific to optometry is the implant's wireless glucosemonitoring contact lens," Dr. Bhamra said.

"The transmitter collects the pressure data from the sensing chip and transmits it wirelessly to a smartphone application. This is how it enables 24hour IOP monitoring — all the patient requires is instruction by a healthcare professional prior to first time usage," he said.



The transmitter device has been under development for a number of years, however, a paper on the device was just published in June this year. Given the exponential rise of interest in telemedicine technology due to the coronavirus pandemic, it is no small surprise that interest in the Purdue transmitter is also increasing. It can offer both an effective means of managing IOP, while also being able to operate under social distancing conditions.

The key factor ensuring the effectiveness of the transmitter device is battery usage. Typically, radiofrequency (RF) transmitters are the most power-hungry circuit in wireless body sensor nodes and biomedical devices. This is where Dr. Bhamra believes his device leads the pack.

An opportunity for investment and development

"In previous studies, focus was given to either reducing active or leakage power consumption, but not both. In our study we designed and implemented the transmitter for both low active and low leakage power consumption," Dr. Bhamra said.

"Thanks to our work, our transmitter has an energy efficiency of 7 picojoules per digital-bit, which makes it the world's lowest energy consuming RF transmitter reported to date. Additionally, this chip is wirelessly powered without having any bulky and costly external electronic components that makes the system lightweight and cost-effective," he added.

The transmitter is now patented as part of the team's cooperation with the Purdue Research Foundation Office of Technology Commercialization. According to the University, they are currently looking for partners to develop the technology further. For more information, contact the office at otcip@ prf.org with the reference track code 2016-IRAZ-67415.

Contributing Doctor



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Eye Screening? There's an App for that!

by Brooke Herron

ohn Davis Akkara, MD, is an ophthalmologist at Westend Eye Hospital in Cochin, India. But before he committed to medicine, he was fascinated by computers and technology.

"Even while in medical school, I learned mobile software programming and developed a few apps," he said. "During ophthalmology residency and fellowship, I continued to merge my passion for ophthalmology and technology to develop a few ophthalmology apps as well."

Since then, he's developed numerous smartphone apps for both ophthalmologists and optometrists to assist with screening, diagnosis and more. Among them are the 3D Atlas of Ophthalmology (for stereoscopic atlas of eye conditions); Eye Grader (for grading systems in ophthalmology); Eye Know Tamil (a local language helper app for eye care specialists); and iDoctor JD (a vision testing app). These are currently available in the App Stores for Android and iPhone.

And now, with the COVID-19 pandemic making access to eye care more difficult worldwide, telemedicine and apps such as these can contribute to the effort to avoid preventable blindness and provide continued medical care. Below, Dr. Akkara discusses the different apps available to eye care professionals and their patients — as well as their potential impact in eye care.

Riding the tech wave

"Smartphones are now an essential part of modern daily life and the medical field is no exception," began Dr. Akkara. "With the simple phrase, 'there's an app for that,' many problems of modern life have been solved — even in eye care for doctors and patients." In fact, smartphones have driven most of the recent innovations in ophthalmology, noted Dr. Akkara in a 2018 paper called *Innovative Smartphone Apps for Ophthalmologists*.¹

He shared that there are some apps (such as the Eye Handbook), which do a variety of things like comprehensive patient vision assessment, ophthalmic calculations, international classification of diseases and more — while many other apps are specialized in one or a few tasks only.

"[There are] apps for vision testing including acuity, contrast, color vision and stereo acuity. There are also apps to test optokinetic nystagmus, to do optometric calculations, to do virtual perimetry and grade various ophthalmic signs," said Dr. Akkara.

He continued that there are several innovative apps that enable easy, affordable and portable vision testing via smartphone. "Other apps may be useful for a quick reference (EyeGrader), learning (3D Atlas of Ophthalmology) or smartphone fundus photography (HopeScope, Ullmann Indirect & MIIretcam)," explained Dr. Akkara.

Apps that assess near and distance visual acuity (VA) have been found to be reliable in an emergency setting, although there is still some standardization needed in the brightness and contrast of the smartphones and optotype sizes.

Dr. Akkara said there are also apps that help patients: There are now several apps where can set a medication schedule to ring an alarm and remind the patient to follow the correct dosing of medications. These are especially useful in chronic diseases like glaucoma. There are also apps that stimulate vision in cataract, glaucoma, diabetic retinopathy patients, and in different types of intraocular lenses (IOLs).

"Patients also get the benefits from faster and affordable eye care," he said, adding that patients may also find medication reminder apps very useful.

Further, in 2019, Dr. Akkara authored



another paper on *Smartphone Apps for Visually Impaired Persons.*² These apps can help with daily tasks, with talking clocks, calculators and camera functions, but there are also apps that can help patients identify objects, recognize people, identify currency, and read signs and text.

"Smartphones can also be easily used as magnifiers and contrast enhancing low vision aids with free apps," he said. "One innovative app is *Be My Eyes*, in which sighted volunteers can help the visually impaired in identifying anything with their smartphone camera."

The 'smart' future of eye care

Worldwide, there is still a huge disparity

in access to eye care. Dr. Akkara suggests some of these apps could help bridge that gap for patients in rural or underserved communities.

"One of the biggest advantages of these apps is that they increase healthcare access by improving availability and reducing the cost of care. Smartphones are becoming very affordable and these apps and techniques definitely help to bridge the gap in access to healthcare, not just eye care," he shared.

And fortunately, for doctors and patients alike, the momentum continues to build. Dr. Akkara shared that there are several interesting innovations already in use: "Smartphones can be used to take anterior and posterior segment photographs via small and low cost adapters with image clarity rivalling that from conventional expensive cameras," he said, adding that smartphone gonioscopy, corneal topography, and imaging of endothelial cells have also been demonstrated.

"As technology progresses and becomes more affordable, we should try to find ways to help each other using these. Technology should not divide us, but rather unite us as humanity.

"We see a lot of disease and ill-health as a consequence of inequitable distribution of wealth and technology, and much of this can be easily improved by careful redistribution of available resources with no disadvantage to anyone," concluded Dr. Akkara.

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Contributing Doctor

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Dr. Akkara's Top 5 Apps *Most are available in the iPhone and Android App Stores*

- 1. Eye HandBook is a free (but ad-supported) multipurpose ophthalmic app with multiple vision tests including near vision, color vision, optokinetic nystagmus drum, Amsler grid, contrast sensitivity and Worth 4-dot test. It also has multiple optometric calculators such as a glaucoma risk calculator, visual acuity convertor and IOL power calculators. In addition there is ICD coding, forums, videos, eye atlas and references for patient education. "Truly an essential app for eye care specialists," said Dr. Akkara.
- 2. Peek Acuity is a free app from Peek Vision that allows for rapidly distance VA measurement using an E chart with built-in calibration. "The innovative swiping and shaking method allows quick and accurate VA measurement and there is also a simulator showing the blurred vision experienced at different visual acuities," he shared.
- 3. Eye Chart Pro & Remote are a pair of apps for iPad and

iPhone that work as a remotecontrolled and calibrated VA chart with multiple optotype options, and additional charts such as Amsler grid and Duochrome test. The app is free, with the option to purchase for more advanced features.

- Eye Grader is a free app developed by Dr. Akkara for clinical grading of several ophthalmic signs, symptoms and findings, including approximately 70 grading systems, which are searchable and also can be browsed by topic. "A few examples include cataract (LOCS), gonioscopy (Spaeth, Scheie, Shaffer, RP Centre), bleb (Moorfields, Indiana) and so on."
- 5. visualFields easy is free iPad-based software that tests suprathreshold visual fields easily. "This technology has rapidly evolved in the past few years to make portable, accurate, affordable, virtual reality perimetry possible," said Dr. Akkara.

complimentary **Scratching** slice of CAKE (online) in COOKIE the Surface Talking Dry Eye with Dr. Laura Periman by Sam McCommon

e've all experienced it at some point: Red, irritated, itchy eyes that can really take the wind out of your sails. Dry eye is a common condition affecting millions worldwide, and it's becoming more and more common. Increased screen time, air pollution and plenty of other factors such as poor nutrition, personal habits, cosmetics and skin care — including mask use - can contribute to and exacerbate the problem.

It's something that has certainly affected humankind for its entire existence, but is becoming more widespread in modernity. The demographic of dry eye sufferers is expanding beyond the classic postmenopausal female group to include younger and younger patients.

As such, the condition is certainly on physicians' and pharmaceutical companies' radars. New treatments, better understanding and greater patient-doctor access are all arrows in a physician's quiver to target dry eye.

Enjoy a

To wrap our heads around the topic, CAKE magazine spoke with dry eye expert, Dr. Laura Periman, a board certified, cornea-trained ophthalmologist, based in Seattle. She's recently opened her own independent clinic focusing on dry eye, so she's a true guru in the field.

Addressing the elephant: dry eve and COVID-19

First, we should address the elephant in the room that's affected all medical fields, and everything else for that matter: COVID-19. During lockdowns in various places, ophthalmic clinic visits dropped precipitously as both patients and doctors feared spreading the virus. Now, however, in places



where the lockdowns have been lifted, there appears to be surging demand.

"What I'm seeing is a breaking of the dam effect," said Dr. Periman. "Clinics were closed and patients held back in their dry eye care during the shelter-in-place order. I continued to help patients by quickly switching to telemedicine. There's a lot you can do with telemedicine to get people teed up for success. We still offer telemedicine as a way to establish care, gather a great deal of information, start certain therapies and then, now that the clinic is open, they come in for advanced diagnostics and treatment. We're seeing pent up demand that's been unleashed."

So, that's good news: Patients are returning in great numbers to get their dry eye treated. What's more, the lockdowns accelerated the development of tools like telemedicine and home treatment devices.

Mask-associated dry eye (MADE)

Interestingly, one side effect of COVID-19 Dr. Periman has noted is an uptick in mask-associated dry eye — MADE, a term coined by her colleague and friend Darrell White, M.D. Essentially, turbulent air exhaled is pushed up through ill-fitting masks and is directed towards the eyes instead of away from the face. This can lead to desiccating stresses and fuel the inflammatory cascade which can cause or worsen dry eye in vulnerable patients.

Dr. Periman has a solution, however, and it's relatively simple. The problem comes from ill-fitting masks, so making the masks fit better is the answer. To do this, she suggests lowering the mask down the nose a bit, but so it's more across the cheeks — and then using one-inch surgical paper tape to secure the mask snugly to the cheeks. Half the tape should be on the mask and the other half should be on the skin.

When removing the tape, do so very carefully to avoid damaging skin. Support the skin with one hand while gently, obliquely removing the tape off with the other to prevent skin injury or bruising.





New treatments could provide an oasis of relief for dry eye sufferers.

New treatment options for dry eye

With the elephant out of the way, we can turn our attention to new treatment developments. And if Dr. Periman's enthusiasm is any indication, these developments are exciting indeed.

There are drugs being developed to treat individual aspects of dry eye, including pain and lack of lubricity. For example, Novartis (Basel, Switzerland) has a TRPV1 antagonist for treating pain associated with dry eye. Another drug underway is Lubricin (Lubris BioPharma, Framingham, Mass., USA), an eye drop that may be particularly useful for patients with autoimmune disorders. And Azura (Tel Aviv, Israel), is developing a drug to address the hyperkeratinization of meibomian gland dysfunction. All of these drugs are currently in phase 2 clinical trials.

Another interesting treatment option is neural stimulation. An external vibration neural stimulation device, iTear100, by Olympic Ophthalmics (Washington, USA), was approved in May 2020 to increase tear production and Dr. Periman told us she has seen wonderful clinical success with this device. A pharmaceutical option in development is a nicotinic acetylcholine nasal spray by Oyster Point Pharma (New Jersey, USA). It stimulates the lacrimal functional unit to produce physiologically complete tears and increase tear volume.

Novalig (Heidelberg, Germany) has developed a water-free and preservative-free eve drop for dry eye dubbed NovaTears® that may provide significantly longer relief and greater spreading while also being preservative-free. Dr. Periman tried it in her own eyes and was impressed. The formulation is called CyclASol, currently in clinical trials, would use the EyeSol water-free vehicle to deliver cyclosporine A, which is water insoluble and a well-established and important anti-inflammatory and immunomodulating drug valuable for dry eye.

Allergies and Dry Eye: New Evidence, New Treatments

One topic Dr. Periman focused on is the greater understanding of the role of allergies in dry eye, as well as improved treatment options. It's particularly important because we now have scientific evidence explaining the immunologic bridge between allergic conjunctivitis and meibomian gland dysfunction.

As Dr. Periman put it, "When that paper came out my jaw hit the floor. This made me way more aggressive in treating allergies."

To test for allergies, she has a quick and effective method. If she sees

papillary conjunctivitis changes on a patient's lower palpebral conjunctiva, she'll do a test dose of anti-allergy in one eye and an artificial tear in the other eye. At 3 minutes, she'll ask the patient which eye feels better. If the anti-allergy medicine treated eye feels better, voila: Allergies are a component of the overall ocular surface disease picture. Even smoldering, low-grade levels of allergy need to be addressed topically with anti-allergy drops, including the new topical anti-allergy drop Zerviate (Eyevance, Texas, USA).

This new understanding of allergies has also made her appreciate topical steroids even more than before, especially for flare-ups. She said there is definitely a role for short-course steroids, and pointed to steroids specifically for dry eye.

FLAREX (Alcon, Geneva, Switzerland) is an eye drop used to treat eye inflammation, and has been FDA approved since the 1980s. It's valuable as a periodic dry eye treatment as well. Dr. Periman noted that it has an excellent safety profile and has the efficacy of Pred Forte (prednisolone acetate; AbbVie, Dublin, Ireland) with the safety profile of FML Forte Suspension (Allergan, California, USA).

Another steroid in development is called Eysuvis, from KALA Pharmaceutical (Massachusetts, USA). Eysuvis is currently in phase 3 clinical trial, and is expected to receive FDA approval in October. When (and if) it does, it will be the first steroid specifically indicated for dry eye.

Increased physician access and home treatments

As mentioned earlier, one positive outcome from the COVID-19 crisis has been the dramatic uptick in telemedicine and home devices. Especially with doctors being able to practice telemedicine across state lines, patients have greater physician access than ever before.

"The patient access part is so important and it's such a relief to patients," said Dr. Periman. "You can still get access to dry eye experts via telemedicine. I'm hoping the advances



we've made with telemedicine will not be repealed by Congress. With COVID, there was a bunch of relief that came from Congress and reimbursement for telemedicine in different states, and so on. It's been pivotal in creating enhanced access for patients. And they love it and appreciate it."

Home devices

Dr. Periman discussed some new home devices that can be valuable tools in combating dry eye. One of them is NuLids (NuSight Medical, California, USA): a device that helps stimulate and clean the meibomian glands. As Dr. Periman said, "I'm seeing really exciting clinical results with NuLids and patients love it."

Masks for dry eye treatment can also provide significant relief. Masks vary from microwaveable designs like the classic (Bruder, Georgia, USA) to USB designs and combination therapy masks (EyeEco, California, USA). Dr. Periman emphasized that masks that combine modalities of heat and vibration may help maximize pain relief for dry eyes.

LED face masks sold for beauty and skincare may be effective for dry eye through a process called photobiomodulation. Currently, there are in-office treatments using intense pulsed light (IPL) for facial and ocular rosacea. The Lumenis Optima IPL M22 (Yokneam, Israel) is approved in Europe, China and Australia for meibomian gland dysfunction and dry eye. The U.S. label expansion is in process. The significant majority of peer reviewed literature demonstrating the benefits of IPL treatments for dry eye and MGD is with the Optima M22 platform.

Great progress, but there's still a long way to go

It's true that there have been wonderful advances in dry eye treatments, and increased focus on the condition will lead to even greater options. But as the condition becomes more prevalent, it will become clear that there's even more to do.

Refractive procedures like LASIK and PRK can lead to dry eye. Plastic surgery and neurotoxins for crow's feet can also contribute to it. Systemic medications, antihypertensives and autoimmune disorders like Sjogren's syndrome and rheumatoid arthritis, can also lead to dry eye. Dr. Periman noted that there are a lot of undiagnosed autoimmune disorders that cause dry eye.

What this means is that while there have been significant developments for dry eye, the problem will still exist. Other things are still missing in the ophthalmologist's tool kit. Dr. Periman said, for example, there has been incredible progress in advanced diagnostics but more still needs to be done. Ophthalmologists need the ability to do a detailed analysis of the inflammation profile of tears. Furthermore, they need more readily available point-of-care imaging studies such as confocal microscopy, which can often solve clinical puzzles such as the corneal neuropathic pain with the ultrastructural analysis of the corneal nerves.

And still, there are very challenging cases of dry eye. Dr. Periman's take? "That only points to the fact that we have to keep learning, innovating and discovering for our wonderful patients. We're just beginning to scratch the surface."

Home Modification for Dry Eye

In addition to treatments for dry eye, patients can also adapt their home or office environment to be friendlier to their eyes. Some suggestions Dr. Periman has for patients include:

- Lower your computer monitor. This decreases the surface area of the eye exposed to evaporation stresses.
- Get a desktop humidifier, and keep your workstation and room humidity at a minimum of 60 percent.
- Stay well hydrated and practice good nutrition whenever possible.
- Watch your cosmetic habits: For example, don't use eyeliner on the eyelid margin if you're vulnerable to dry eye. Avoid soap around your eyes. Do not use eyelash perms or eyelash extensions. Replace your mascara frequently. Avoid parabens in your eye creams and eye cosmetics.
- Take omega fatty acid supplements. There's enough evidence to support the role of omega fatty acids in ocular health. Choose brands such as HydroEye (ScienceBased Health, Spring, Texas, USA) with excellent clinical science demonstrating benefits to the dry eye patient.
- Certain vitamins and supplements may help, but Dr. Periman indicated she's seen patients take supplements too far and cause toxicity from over supplementation.

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ry eye can be a literal pain, with symptoms ranging from stinging, burning, watering and itching. But it can also be a serious disease. If left untreated — or if it becomes severe complications may arise that cause real damage like impaired vision, or in rare cases, vision loss.

Dry eye disease (DED) can result from a range of daily activities, like allergies or contact lens use. In addition, increased screen time from smartphones and computers can affect the eyes and worsen dry eye symptoms.

"We are spending an average of 13 hours a day on our devices — and a lot of people are doing more than that. You work eight hours a day, spend time on social media, play games and watch Netflix — all on the laptop or iPad," said Jason Teh, an optometrist at In2Eyes Optometry in Melbourne, Australia. Dr. Teh has 19 years of experience and a Bachelor's of Optometry. "We spend so much time on devices that our eyes are going to pay a price — and that price is coming if we don't make an impact on screening for dry eye," he said.

"There are many studies that show up to 70% of Asians have meibomian gland dysfunction (MGD). That is a high number. In the United States, it's about 20%," said Dr. Teh. MGD is a blockage or some other abnormality of the meibomian glands resulting in not enough oil secretion into tears. This then causes the tear film to evaporate too quickly and results in MGD's association with DED.

In his practice, Dr. Teh has a high number of Asian patients. Following screening, he's found that nearly 40% of his patients had the condition. "Undiagnosed MGD is going to be a massive problem worldwide in the next five to 10 years," he said.

Fight DED with diagnosis

Dr. Teh says the latest technology in dry eye diagnosis and assessment is the OCULUS Keratograph 5M (K5M; OCULUS Optikgeräte GmbH; Wetzlar, Germany). He has been using the device for the last five years. The system integrates a high-resolution camera, keratometer and corneal topographer combining corneal topography and dry eye analysis in one machine.

"I use the KM5 because it allows me to do everything: I can measure noninvasive Keratograph tear film break-up time (NIKBUT), look at tear volume, assess the meibomian glands to see how well the oil glands are structured in the upper or the lower lid," said Dr. Teh.

"We can also do stainings — by using fluorescein dye and changing the settings to blue light, we are able to capture any signs of damaged cells on the corneal surface. So, many of these are the key diagnostics that we need."

The Keratograph 5M allows optometrists to assess and record the extent of patients' DED — using non-invasive methods to take high-resolution images, with a wide variety of tests and software analyses, all of which provides patients with more insight into their condition.

Dr. Teh says it's the dry eye assessment that really makes the Keratograph 5M stand out among other similar devices. Part of this is customization: The dry eye assessment can be modified to a particular preference, or a set protocol from a dry eye society like TFOS (Tear Film & Ocular Surface Society) can be followed.

"Once you select your protocol, it will take you through each test you need to do," he shared. Once the patient's data is captured with the K5M, optometrists can plan the best treatment. These results are also summarized in a patient-friendly printout to assist with documentation and patient education, which is a further benefit, said Dr. Teh. "You can put all your findings together in a report and show the patient exactly what each stands for . . . you can also add in your diagnostic suggestions and management plan."

More than dry eye

The Keratograph 5M is not just for diagnosing dry eye either.



"The K5M is a powerful tool for contact lens fitting . . . you can fully customize the lens just based on these measurements," said Dr. Teh. These measurements include corneal topography, pupil size, contact lens fitting and NIKBUT.

"The corneal topographer maps the curvature of the eyeball and gives us the measurements of how steep and flat it is at different meridians. With that, the visible iris diameter can be measured and that then helps determine the size of the contact lens needed.

"The pupil size can also be measured and that will help ensure the lens is centered," continued Dr. Teh. "If the pupil is big or small, it will be clear or blurry depending on the optic zone of the contact lens. For example, if the optic zone is small, but the pupil size is big, then you're going to get glare and halos — but if you know the pupil matches the optic zone of the contact lens, then the vision outcome is going to be good."

The Keratograph 5M can also help with fitting during follow-up — especially with hard lenses which are suitable for dye. "You can put the dye into the eye with the contact lens on and you use imaging to check the fit. You can do a video recording of that fit as well," Dr. Teh explained. "This is one feature that really makes it stand out — how good the blue light imaging is.

"The other cool thing I like to do, especially with soft lenses, is to have a look at the length of time it takes for that lens to dry out, to see whether or not the patient is going to have any problems with wearing contact lense for a long period of time," he said. This is done using NIKBUT while the patient is wearing the contact lenses. "You get the patient to blink twice and it will measure how long it takes for the tear film to evaporate from the surface of that contact lens.

"You can even show off how well eye drops work by dropping lubricant in their eye and performing the same test before and after application. So, it guides you in terms of what type of tears are better for that particular surface." Further, Dr. Teh explained that there aren't many devices that measure pupil function (constriction and recovery) when submitted to light stimulus. "You can actually measure recovery time for pupil function, so that stands out."

Clear benefits

According to Dr. Teh, the patient experience is generally very powerful and very good because the Keratograph 5M has so many features and functions. He says these make the Keratograph 5M "all encompassing" and provide the patients with a lot of "wow factor" especially when discussing the results.

"The K5M is the 'jack of all trades' and it's pretty much the master of all. You have so many different things that you can do with the one device and that's what makes it so so valuable," he said.

Dr. Teh says of all the equipment he's acquired at his practice over the last 10 years, the Keratograph 5M is the most valuable. "The K5M gives me the best value for money. We use it more than pretty much any other instrument and it gives us so much information and so much value for the price we pay," he concluded.

Contributing Doctor

Dr. Jason Teh is a member of the Optometry Australia Association and has been practicing optometry for more than 19 years. His interest in optometry started from a high school

work experience with an optometrist, which led him to study two degrees at Melbourne University. This included a year of research into the causes of myopia. During his thesis year, he graduated with honors and from there he completed his Bachelor of Optometry. Dr. Teh started a myopia management clinic more than 10 years ago as part of an effort to reduce the impact of short-sightedness in the general community. He believes that the next major threat to eye health comes in the form of tear film dysfunction, and he now runs a busy dry eye group out of three locations with his team of optometrists.

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Updates in Controlling and Correcting Myopia Progression in Children by Chow Ee-Tan

n 2000, low to moderate myopia was prevalent in 20.2% or 1.243 billion people around the world. This figure is estimated to increase to 40% or 3.82 billion by 2050. Meanwhile, high myopia is expected to increase from 2.7% (or 163 million) to 9.8% (or 938 million) in the same time frame.

Further, the World Health Organization (WHO) World Report on Vision 2019 noted that 2.6 billion have myopia and of those, 312 million are under 19-years-old. In addition, one billion have no access to eye care — as eyeglasses are unaffordable or not accessible.

These statistics were revealed in a CooperVision webinar entitled "Utilizing Multifocal Center Distance Soft Contact Lens in Myopia Management," presented by Dr. Carmen Abesamis-Dichoso.

Dr. Abesamis-Dichoso, an optometrist and eye care practitioner at Abesamis Eye Clinic in the Philippines, believes myopia is transforming from benign to a disease epidemic. Quoting the International Myopia Institute (IMI), she defines and classifies myopia with a proposed set of standards for clinical and epidemiologic studies.

She said that high myopia occurs when the refractive error is -6.00D or more when ocular accommodation is relaxed, and where pathologic myopia axial length is 26 mm or longer.

The role of sunlight in myopia control

Sunlight can explain the protective effect of outdoor activity against myopia, said Dr. Abesamis-Dichoso.

"For every one log unit increase in average daily light exposure, (which

in the study equated to approximately 90 minutes or more of daily outdoor light exposure), the axial growth rate decreased by 0.12 mm/year (about 0.3 - 0.4 D slower myopia progression)," which was a result of a study in Australia.

Meanwhile, the Guangzhou Outdoor Activity Longitudinal study (GOAL) showed that 40 min/day of outdoor activity decreased myopia onset by 9% after three years. Another interventional study in Taiwan revealed that 80 min/ day of intermittent outdoor time could decrease myopia onset up to 9% in only one year.

"A recent meta-analysis done by Shuyu Xiong et al. showed that with every additional one hour of outdoor time per week, the risk of myopia onset is reduced by 2% in children and adolescents," said Dr. Abesamis-Dichoso.

This was further demonstrated by the Role of Outdoor Activity in Myopia (ROAM) study, which followed 101 children between 10 to 15 years of age, of whom 41 were myopic and 60 were non-myopic, from 42 Brisbane schools. Aussie kids generally spend more time outside than kids in many other countries, including Asian countries with a high incidence of myopia.

According to Stephen Vincent, OD, PhD, with the Queensland University of Technology, differences in daily outdoor light exposure may be one factor underlying the higher prevalence of myopia in Singapore. Singaporean students are exposed to 61 minutes of outdoor sun per day compared to 105 minutes for Australian children.

He concluded that bright light exposure for 60 minutes or less per day is a risk factor for faster eye growth, whereas daily outdoor light exposure of 60-90

minutes/day is likely to slow eye growth.

Li Deng, PhD, and her associates at the New England College of Optometry (NECO) Department of Vision Science also agreed that participating in more hours of sports and outdoor activities during the school year may protect against myopia development.

Controlling and correcting pathological myopia

Myopia is found globally across ethnicities and its complications such as myopic maculopathy (MM), glaucoma, retinal detachment (RD) and cataract can be sight threatening, said Dr. Abesamis-Dichoso.

Pathological myopia is real and alive. A convincing case has been made that the delineation of physiological and pathological myopia is not valid, as the term "physiological" implies that there is a level of myopia which could be considered "safe" in comparison to emmetropia.

Using odds ratios, which describe the increased risk of a condition over a reference of one (this being the risk of emmetropia), it shows that even 1 D of myopia doubles the risk of MM and PSCC (posterior subcapsular cataract), and triples the risk of RD compared to the emmetrope. At 3D of myopia, the risk of PSCC triples, with the risk of RD and MM being nine times that of the emmetrope.

"We all know by this time that standard regular single vision glasses do not work," said Dr. Abesamis-Dichoso. However, recent investigations suggest that undercorrection may enhance, rather than slow down, myopia progression in children, she added.

"Our findings support the hypothesis



that myopes have an abnormal mechanism for detecting the direction of optical defocus of the retinal image. We suggest that this results in the stimulation of eye elongation when blur is present, rather than the expected inhibition of growth when the eye is myopic.

"We also conclude that the popular therapeutic strategy of under-correcting myopia in children may be not only unwarranted, but even potentially harmful," she said.

A recent retrospective analysis of a private optometric practice's clinical data further supports the notion that undercorrection results in greater myopia progression compared to full correction. Authors reported a significant positive correlation, with greater amounts of undercorrection resulting in greater myopic progression.

Another option is orthokeratology (also known as Ortho-K, OK or Overnight Vision Correction), which refers to the use of gas-permeable contact lenses that temporarily reshape the cornea to reduce refractive errors such as myopia, hyperopia and astigmatism.

According to Dr. Abesamis-Dichoso, overnight orthokeratology has shown to be effective in slowing myopia progression over a 12-year follow-up period and demonstrated a clinically acceptable safety profile.

The risk of microbial keratitis (MK) with overnight orthokeratology was similar to other overnight modalities. The risk of MK for daily disposable contact lenses is 2 in 10,000 wearers per year; for monthly disposable contact lenses, the rate is 12 in 10,000.

Dr. Abesamis-Dichoso also discussed the efficacy of various strategies to control myopia.

"The most efficient myopia control strategies are atropine, Ortho-K, multifocal contact lenses, prismatic bifocal lenses, peripheral addition lenses, and time spent outdoors.

"Refractive surgery is NOT effective, as well as single vision lenses and contact lenses, because these interventions only correct myopia — instead of controlling it," she emphasized.

Meanwhile, accommodative and binocular vision (BV) conditions are about nine times more common than ocular disease in patients aged 6 months to 18 years. Of these, approximately 20% have a binocular vision condition.

Slowing the progress of myopia with MFCL

She then described multifocal contact lenses (MFCL) with a 2.0 mm central distance zone and 2.0-5.0 mm increasing plus power across a 5.0 mm pupil, including: Acuvue Oasys (Johnson & Johnson, Florida, USA); CooperVision MiSight (California, USA); CooperVision Biofinity; and Visioneering Technologies NaturalVue (Georgia, USA).

Dr. Abesamis-Dichoso detailed a study that found in 70% of the children, myopia progression was reduced by 30% or more in the eye wearing dual focus (DF) lens, relative to that wearing the single vision distance (SVD) lens in period one (10 months). Similar reductions in myopia progression and axial eye elongation were also observed with DF lens wear during period two (10 months further). Visual acuity and contrast sensitivity with DF lenses were not significantly different than with SVD lenses. Accommodation to a target at 40 cm was driven through the central distance-correction zone of the DF lens.

"Soft multifocal contact lenses with a distance center design may slow the average growth of the myopic eye, and some studies suggest that the treatment effect for axial elongation continues to accrue beyond the first year of treatment," she said.

She then covered an August 2020 report published in JAMA that asked: Can soft multifocal contact lenses with high add power slow myopia progression in children more than medium add power or single-vision contact lenses?

The clinical trial found "that in children with myopia, treatment with high add multifocal contact lenses — compared with medium add multifocal and singlevision contact lenses — reduced the rate of myopia progression over three years (but further research is needed)." [Editor's Note: See infographic on page 37]

Further, Dr. Abesamis-Dichoso said the ideal candidate for multifocal soft contact lenses (MFSCLs) should be mature, motivated, with parental support and myopia with low astigmatism, with very limited reusable soft multifocal toric options and no daily disposable multifocal toric option.

If the child is a suitable contact lens wearer, the contact lens options can be OK or MFSCLs OrthoK, Toric MFSCLs, or daily disposable MFSCLs. They should work with 50% efficacy, she concluded.

Editor's Note:

The CooperVision webinar took place on August 15, 2020. Reporting for this story is from information obtained from that webinar.

Contributing Doctor



Dr. Carmen Abesamis-Dichoso is a Fellow of the American Academy of Optometry and the Philippine College of Optometrists. She 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 and has been actively practicing myopia management and control Since 1998, she has been self-employed in private practice at Medical Plaza Makati.

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Question

Can soft multifocal contact lenses with a high add power slow myopia progression in children more than medium add power or single-vision contact lenses?

Conclusion

This clinical trial found that in children with myopia, children with high add multifocal lenses, compared with medium add multifocal and single-vision contact lenses, reduced the rate of myopia progression over 3 years, but further research is needed.

Population



Children aged 7-11 years with -0.75 to -5.00 D myopia and corrected visual acuity 20/25 or better

Mean age: 10 years

Locations





Intervention



294

Children randomized

High add power contact lenses

2.50 D power contact lenses

Medium add power contact lenses 1.50 D power contact lenses Single-vision contact lenses Single-vision soft contact lenses

The difference for high add lenses was significant

High add vs single-vision: 0.46 (0.29 to 0.63); *P*<.001 Medium add vs single-vison: 0.16 (-0.01 to 0.33); *P*=.19 High vs medium add: 0.30 (0.13 to 0.47); *P*=.004

Primary Outcome

Change in myopia progression at 3 years, measured via cycloplegic spherical equivalent autorefraction



Change in refractive error, mean, over 3 years

High add power contact lenses -0.60 D (95% Cl, -0.72 D to -0.47 D)

Medium add power contact lenses -0.89 D (95% CI, -1.01 D to -0.77 D)

Single-vision contact lenses -1.05 D (95% Cl, -1.17 D to -0.93 D)

Walline JJ, Walker MK, Mutti Do, et al; BLINK Study Group. Effect of High Add Power, Medium Add Power, or Single-vision Contact Lenses on Myopia Progression in Children: The BLINK Randomized Clinical Trial. JAMA. 2020;324(6):571-580.



CONFERENCE HIGHLIGHTS | OIS COVERAGE

OIS Dry Eye Innovation Showcase

Making Great Strides in Therapeutics and Technology by Joanna Lee

he latest innovations in drugs and devices that ease the sting of dry eye increase opportunities for profit and are pioneering a continuum of care.

Dry eye disease (DED) is sometimes taken as seriously as chapped lips. Yet, while 42% of eye care patients (or up to 80 million Americans) have complained of symptoms that indicate DED, only 16 million were diagnosed with DED and only 1.6 million are being treated. This means that only 5-6% of the U.S. population gets any DED treatment, representing a great opportunity for DED therapeutics. "We're in the infancy of this," said Dr. Paul Karpecki, director of cornea services and external disease at the Kentucky Eye Institute, as he moderated the session.

Not only that, but Dr. Karpecki also said what was thought of as an "elderly disease" is now changing due to factors like increased time spent on digital devices. The Beaver Dam Offspring Study (BOSS) showed that the prevalence of dry eye in children now matches that of their parents. Women over the age of 65 suffer from DED twice as much as men. However, there doesn't seem to be a large statistical difference between men and women aged 21-34 when it comes to DED.

Dr. Karpecki also revealed that many specialty clinics that treat DED have been doing well with 100% return to profitability, especially during the COVID-19 pandemic. "Because their quality of life is affected, they're more likely to come in," he said.

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With much room to make a difference, the Dry Eye Innovation Showcase (by Ophthalmology Innovation Source; OIS) featured eight startups and gave the audience a glimpse into the exciting developments in this growing area of treatment in ophthalmology.

What the market offers

The first presentation showcased Novaliq's unique water-free technology EyeSol®, which overcomes waterbased limitations in eye drops. Out of this technology, Novaliq (Heidelberg, Germany) was able to develop CycIASol®. Its Vice President of Preclinical and Clinical Development Dr. Sonja Krosser revealed CyclASol® has been able to improve cornea damage significantly over Restasis[™] by reducing blurred vision and frequency of dryness. One highlight was that the trial's subjects reported reading speed improvement with corneal staining reduction. The technology's increased residual time on the eye's surface, from minutes to hours, also has positive effects on its bioavailability. CyclASol may just fill the gap for the 60% of patients who abandon their treatment due to discomfort. "Its excellent tolerability profile is key for compliance," she said.

In the area of imaging, Ra'anan Gefen, the managing director of AdOM Advanced
Optical Technologies, an Israeli med-tech company, presented a singular

device that comprehensively diagnoses DED. The Tear Film Imager (TFI) is currently deemed as the only device that measures muco-aqueous and lipid sublayers simultaneously in nanometer resolution. "A single 40-second automatic non-invasive test provides objective and quantified parameters," he said.

The technology was developed as a result of the understanding that mucus is a barrier for topical ophthalmic drug delivery. Besides its ability to capture measurements in 40 seconds, it has a high frame of more than 10 hertz to capture tear film dynamics (the first in the market to do so), with artificial intelligence capabilities to analyze captured images.

The role of therapeutics

Stepping in to combat the mucus barrier for topical ophthalmic drug delivery is Kala Pharmaceuticals (Massachusetts, USA) with its AMPPLIFY® Technology drug delivery system. Its Chief Medical Officer Dr. Kim Brazzell explained how AMPPLIFY delivers drugs using nanoparticles with its proprietary coating to avoid interaction of the drug particles with the mucus.

"In the eye, it avoids adhesion to the eye's tear film mucins, thus enabling rapid penetration through the tear film and enhancing diffusion in the ocular tissues," Dr. Brazzell said. Significant improvements were seen in both signs and symptoms in the same population during the four trials of this system (primary for phase 2, STRIDE 1, STRIDE 2 and secondary for STRIDE 3). Also, less than 1% reported any IOP elevation, with no serious adverse events observed.

AMPPLIFY is targeted for a Q4 2020 launch with the potential to become the first-line therapy for the shortterm treatment of DED, including the treatment of dry eye flares, which occur with the vast majority of dry eye patients.



OptimEyes Technologies (Ontario, Canada) sees potential in its patented platform technology using a high dose of cyclosporine. The Micelle technology comprises small polymeric spheres that are able to encapsulate drugs in their core. "Unique to our formulation, the surface of Micelles are adhesive, allowing them to bind to the ocular surface," said OptimEyes's Chief Executive Officer Dr. Frances Lasowski. The value Micelle proposes to bring is that it significantly reduces the dosing needed with enhanced efficacy. In animal trials comparing Micelle (0.075% cyclosporine A) with Restasis (0.05% cyclosporine A), Micelle's dose of once every three days was equal to Restasis' twice-daily dose. It was also shown to help tear volume and staining return to baseline.

Addressing dry eye from a different angle, Tarsus Pharmaceuticals' Chief Executive Officer Dr. Bobak Azamian announced the development of the first drug for Demodex blepharitis. In uncovering this disease (which also causes dry eye), Dr. Azamian highlighted the key role that collarettes play in Demodex infestations. Collarettes are mite waste products and eggs, a pathognomonic sign of the infestation. It is found in 100% of Demodex blepharitis patients' lashes. Dr. Azamian added that blepharitis is a large, unserved market in ophthalmology. He said that Tarsus Pharmaceuticals (California, USA) has completed four phase 2 clinical trials including randomized control trials with very strong and consistent results. Phase 3 trials are underway and phase 2 trials are in the pipeline for 2021.

EyeDetec Medical (California, USA) President and Chief Executive Officer Dr. Barry Linder explained that dry eye is a lipid problem — and not so much a lack of tears. "Lipids prevent evaporation from the tear film, and that's critical," he said. Based on this, they have introduced the Eye Lipid Mobilizer (ELM), a medical device that aims to improve the eye's oil layer and thus, decrease tear evaporation and normalize the ocular surface.

Combining several mechanisms, the ELM would give heat to lower the viscosity of the oil. Next, it induces resonant frequency stimulation (vibration at certain frequencies to induce liquefaction and mobilization of the oil). "Finally, there's an activation of the lacrimal functional unit through neuromodulation to induce expression from the meibomian glands of the oil," he explained. These would be conducted through the device worn over patients' closed eyelids.

The ELM has a strong patent portfolio, he said. EyeDetec has also to date accomplished \$3 million in convertible notes with several products. The most notable is the EyeGiene® Insta-Warmth[™] product, which is a reusable eye mask with single-use warming disposable vapors. The product has been validated clinically by a Singapore Eye Research Institute (SERI) published study, and is a U.S. FDA Class 1 exempt product with early sales in the United States.

What technology contributes

Neurostimulation influences key aspects of dry eye. Enter the iTEAR100 Neurostimulator[™] from Dr. Laura Periman, who is the founder and director of Dry Eve Services & Clinical Research at Periman Eye Institute (Washington, USA). The electromechanical neurostimulator device is indicated for temporary use for up to 30 days to increase tear production. Dr. Periman said "the holy grail is the number of meibomian glands yielding liquid secretions (or MGYLS in literature)," where the iTEAR100 was able to induce a higher yield of the clear liquid fluid in test subjects. In their 6-month trial, there was also a reported decrease in corneal staining. After the neurostimulation, although patients were advised to maintain their treatment regimen, 44% reported being able to decrease their dependence on artificial tears, and a quarter of them were able to get off artificial tears altogether.

Another niche segment with potential is in the diabetic dry eye market. Startup Ocunova's Chief Executive Officer Michael Shine presented on how his company's product OCU001 has been shown to improve corneal sensitivity, increase tear production and rapidly improve dry eye symptoms. OCU001, he said, is a novel, patented ocular dry eye treatment. This potentially unique mechanism is a corneal receptor modulator. OCU001's multiple preclinical trials (animal models) have demonstrated normal tear secretions, improved corneal sensitivity and corneal surface health. Its phase 1 study has shown safety intolerance levels with a successful development through its phase 2a proof of concept trial, with no serious adverse events or tolerability issues — and with dry eve relief experienced within two weeks. Mr. Shine said Ocunova (Pennsylvania, USA) is currently seeking investors for OCU001 in order to complete its phase 2b clinical trials.

Panel take home message

The presentations were followed by the Dry Eye Outlook panel featuring Dr. Karpecki and an esteemed and experienced panel of physicians, namely Dr. Whitney Hauser, Dr. Marguerite McDonald, Dr. Joseph Tauber and Dr. William Tattler. They discussed the reasons behind the small numbers (3-5%) being treated for DED; collarettes in blepharitis; the difference between dry eye disease and meibomian gland dysfunction; the use of steroids for treating dry eye; the current opportunity to specialize in diabetic dry eyes treatments; and the value of treating with on-label therapeutics.

"There are so many causes of meibomian gland dysfunction (MGD) and dry eye, so to find one single treatment is pretty unlikely. I think there will always be a poly-therapy concept. As new products come around, we'll find new ways for them to be symbiotic together," Dr. Hauser said. @

Editor's Note:

The OIS @Dry Eye Innovation Showcase was held on 20th August 2020, 1-4 PM EDT. Reporting for this story also took place during the event. A version of this article was first published online at www.cakemagazine.org on August 21, 2020.

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