A case from a 15-month-old infant using bicapsular capture with the haptics in the sulcus and the optic captured through both the anterior and posterior capsulorhexis.

By Cheryl Guttman Krader; Reviewed by M. Edward Wilson Jr., MD

POSTERIOR OPTIC capture may have value in pediatric cataract surgery, but only for children in a certain age group, according to M. Edward Wilson Jr., MD.

In choosing his surgical approach, Dr. Wilson divides the pediatric cataract population into three subsets based on age:

Group 1) Infants up to their first birthday;
Group 2) Children aged 1 through 7 years; and
Group 3) Patients aged 8 years and older.

It is only for the second group that posterior optic capture could evolve to become standard in the future, said Dr. Wilson, the N. Edgar Miles Professor of Ophthalmology and Pediatrics, Storm Eye Institute, Medical University of South Carolina, Charleston, SC.

"While I would argue that doing a primary posterior capsulotomy or capsulectomy is important in pediatric patients of all ages, posterior optic capture is most important for children aged 1 to 7 years because its use in that subset may keep the visual axis clear even without performing a planned vitrectomy during cataract surgery," Dr. Wilson said.

For infants less than a year old, posterior capsulectomy and planned vitrectomy should be the standard of care because vitrectomy is the only way to keep the visual axis clear, he noted.

ANTERIOR SEGMENT specialists will navigate to San Diego for the 2019 meeting of the American Society of Cataract and Refractive Surgery (ASCRS)—in conjunction with the American Society of Ophthalmic Administrators (ASOA)—from May 3 to 7.

This year's program—geared toward ophthalmologists, practice managers, ophthalmic technicians and nurses, and support staff—promises high-quality education, scientific updates, instructional courses, and myriad networking opportunities.

GLAUCOMA DRUG INNOVATIONS MAKE WAVES IN PIPELINE

The long drought in new glaucoma medications is over. After more than 20 years without a single new glaucoma eye drop, several novel agents have been approved in recent months, with other drugs moving through clinical trials. "There has been a lot of innovation in glaucoma surgery with MIGS, but also a lot of innovation with glaucoma medical therapy," said Richard L. Lindstrom, MD. "We are very fortunate to have this kind of research and investment going on in our field."

See story on page 30:

Pipeline Drug Therapy

April 15, 2019
VOL. 44, NO. 7

CUTTING-EDGE ADVANCEMENTS

CLINICAL DIAGNOSIS | SURGERY | DRUG THERAPY

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The first and only fixed-dose combination of prostaglandin and ROCK inhibitor

Please refer to Important Safety Information on the reverse side.

INUROUS, said Dr. Wilson, the N. Edgar Miles Profes-

Continues on page 27: Pediatric

‘GROOVY’ DOCTOR HONOR Business model awards, profits from vanity of some physicians PAGE 10
ROCKLATAN™ IMPORTANT SAFETY INFORMATION

Contraindications
None.

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- Macular Edema
- Herpetic Keratitis
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Netarsudil 0.02%: Instillation site erythema, corneal staining, increased lacrimation and erythema of eyelid.

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Technique fills pediatric niche

Posterior optic capture key for children at 1 to 7 years; use in this subset may keep the visual axis clear

By Cheryl Guttman Krader; Reviewed by M. Edward Wilson Jr., MD

POSTERIOR OPTIC capture may have value in pediatric cataract surgery, but only for children in a certain age group, according to M. Edward Wilson Jr., MD. In choosing his surgical approach, Dr. Wilson divides the pediatric cataract population into three subsets based on age:

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*Continues on page 27: Pediatric*
ACTIVEFOCUS™ Optical Design:

Only one presbyopia-correcting IOL design delivers a full range of vision with uncompromised distance and unrivaled stability.

Please see next page for Important Product Information and supporting references.
Special Report

13 POTENTIAL PEDIATRIC CATARACT HURDLES
Microinstruments offer ophthalmologist increased control during surgery

Surgery

28 REPRODUCIBLE OUTCOMES STILL GOAL IN CATARACT
Refractive error in first eye may help surgeons predict error in second eye

Clinical Diagnosis

36 AI GAINS MORE ACCEPTANCE
Deep learning is driving growth of three AI models to better serve patients

What’s Trending

See what the ophthalmic community is reading on OphthalmologyTimes.com

1 A woman found *what* in her eye?!

2 Predicting workforce needs difficult

3 Primary lens extraction rivals iridotomy

4 ‘She Sees’ promotes equality

Also In This Issue

10 EDITORIAL

38 MARKETPLACE

Video

Doug Katsev, MD, shares late-stage career ophthalmologist cataract outcomes in a report from JAMA Ophthalmology. (Video courtesy of the Medical News Minute)
OMIDRIA® (phenylephrine and ketorolac intraocular solution) 1% / 0.3% is added to ophthalmic irrigating solution used during cataract surgery or intraocular lens replacement and is indicated for maintaining pupil size by preventing intraoperative miosis and reducing postoperative ocular pain.

The data are compelling and consistent—OMIDRIA makes cataract surgery better for you and your patients

Published and presented clinical studies and manuscripts in press and/or in preparation report that in post-launch (i.e., not included in current labeling), prospective, double-masked and open-label, cohort and case-controlled analyses, the use of OMIDRIA, compared to the surgeons’ standard of care, statistically significantly:

• Prevents Intraoperative Floppy Iris Syndrome (IFIS)
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• Decreases use of pupil-expanding devices (epinephrine comparator)
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• Reduces the incidence of rebound iritis, postoperative pain/photophobia, and cystoid macular edema (CME) in patients without preoperative vitreomacular traction (VMT), when used with a postoperative topical NSAID (compared to postoperative topical NSAID + corticosteroid without OMIDRIA)

OMIDRIA inhibits prostaglandin release, reducing intraoperative inflammation, to prevent miosis and reduce postoperative pain

OMIDRIA is separately reimbursed under Medicare Part B and by many Medicare Advantage and commercial payers.*

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*Based on currently available information and subject to change without notice. Individual plan coverage, policies, and procedures may vary and should be confirmed. Omeros does not guarantee coverage or payment.

IMPORTANT SAFETY INFORMATION

OMIDRIA must be added to irrigating solution prior to intraocular use.

OMIDRIA is contraindicated in patients with a known hypersensitivity to any of its ingredients.

Systemic exposure of phenylephrine may cause elevations in blood pressure.

Use OMIDRIA with caution in individuals who have previously exhibited sensitivities to acetylsalicylic acid, phenylacetic acid derivatives, and other nonsteroidal anti-inflammatory drugs (NSAIDs), or have a past medical history of asthma.

The most commonly reported adverse reactions at ≥2% are eye irritation, posterior capsule opacification, increased intraocular pressure, and anterior chamber inflammation.

Please see the Full Prescribing Information for OMIDRIA at www.omidria.com/prescribinginformation.

You are encouraged to report Suspected Adverse Reactions to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

References:
8. Visco D. et al. A study to evaluate patient outcomes following cataract surgery when using OMIDRIA with postoperative topical NSAID administration versus a standard regimen of postoperative topical NSAIDs and steroids. Presented at: 28th Annual Meeting of the American College of Eye Surgeons (ACES); the American Board of Eye Surgery (ABES); and the Society for Excellence in Eyecare (SEE); Caribbean Eye Meeting; February 1-5, 2019; Cancun, Mexico; 13. OMIDRIA (package insert). Seattle, WA: Omeros Corporation; 2017.

© Omeros Corporation 2019, all rights reserved. 2019-006
The 2019 combined annual meetings of the American Society of Cataract and Refractive Surgery (ASCRS) and the American Society of Ophthalmic Administrators (ASOA) will be held May 3 to 7 in San Diego.

The event is billed by organizers as the largest U.S. meeting dedicated to the needs of anterior segment surgeons, practice management staff, and ophthalmic technicians and nurses.

ASCRS and ASOA promise the event will deliver practical information that attendees at all stages of their careers can apply immediately in their practice through a variety of learning experiences, from innovative symposia and paper presentations to practical instructional courses and hands-on skills transfer labs.

Attendees can enjoy industry-related government relations briefings, an exhibit hall featuring more than 300 exhibitors, and networking opportunities.

They can earn up to 38 CME credits during the regular ASCRS meeting and another 7.5 by attending one of the pre-meeting subspecialty days.

WHAT’S NEW

New this year are the “Meet the Experts” roundtables, giving attendees an opportunity to meet with experts in an informal setting to discuss issues in cataract surgery, IOLs, refractive surgery, cornea, and glaucoma. The roundtables will be held from 8:30 to 9:30 a.m. Saturday. They are free but separate registration is required due to space. Here is the planned lineup:

- “Management of Dislocated IOLs” with Ashley R. Brissette, MD, MSc, and Richard Tipperman, MD
- “Treatment of Astigmatism in Cataract Surgery” with Yuri F. McKee, MD, MS, and Helga P. Sandoval, MD, MSc
- “Complex Cataract Management” with Garry P. Condon, MD, and Zachary J. Zavodni, MD
- “Intracameral Antibiotics” with Allister Gibbons, MD, and Neal H. Shorstein, MD
- “Femtosecond Laser-Assisted Cataract Surgery in Complex Cases” featuring Nicole R. Fram, MD, and Mark A. Kontos, MD
- “Management of Subluxated Lenses” with EHUD I. ASSIA, MD, and Jeremy Z. Kieval, MD
- “Managing Complications During Cataract Surgery” with Gregory S. Ogawa, MD, and Abhay R. Vasavada, MS, FRCS
- “Complex IOL Calculations” with Sumitra S. Khandelwal, MD, and Douglas D. Koch, MD
- “Astigmatism Management” featuring Leela Raju, MD, and Nir Shoham-Hazon, MD
- “Biometry and IOL Calculations” by Bryan S. Lee, JD, MD, and Mitchell P. Weikert, MD, MS
- “Maximizing Patient Outcomes with Multifocal IOLs” with Jessica B. Ciralsky, MD, and Richard S. Davidson, MD
- “Presbyopic IOLs and Astigmatism Correction,” featuring Zaina Al-Mohtaseb, MD, and Karl G. Stonecipher, MD
- “Extended Depth of Focus (EDOF) and Multifocal IOLs” with Optics, Surgical Planning: Daniel H. Chang, MD, and William F. Wiley, MD
- “The Yamane Technique,” Shin Yamane, MD, PhD
- “Managing Bacterial/Viral Blepharitis/Conjunctivitis,” with Allister Gibbons, MD, and Neal H. Shorstein, MD

Continues on page 8: Program
NOW APPROVED. COMING SOON.

BIG TIME INNOVATION

DEXTENZA is an advancement in steroid treatment

- Resorbable, so no need for removal
- Insert can be removed via saline irrigation or manual expression, if necessary
- Physicians rated DEXTENZA as easy to insert
- Designed to deliver a tapered dose
- Contains fluorescein for visualization
- No additional components or assembly required

DEXTENZA is an advancement in steroid treatment

INDICATION
DEXTENZA is a corticosteroid indicated for the treatment of ocular pain following ophthalmic surgery.

IMPORTANT SAFETY INFORMATION
CONTRAINDICATIONS
DEXTENZA is contraindicated in patients with active corneal, conjunctival or canalicular infections, including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, varicella; mycobacterial infections; fungal diseases of the eye, and dacryocystitis.

WARNINGS AND PRECAUTIONS
Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision. Steroids should be used with caution in the presence of glaucoma. Intraocular pressure should be monitored during treatment.

Corticosteroids may suppress the host response and thus increase the hazard for secondary ocular infections. In acute purulent conditions, steroids may mask infection and enhance existing infection.

Use of ocular steroids may prolong the course and may exacerbate the severity of many viral infections of the eye (including herpetic simplex). Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use. Fungal culture should be taken when appropriate. Use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation.

ADVERSE REACTIONS
The most common ocular adverse reactions that occurred in patients treated with DEXTENZA were: anterior chamber inflammation including iritis and iridocyclitis (9%); intraocular pressure increased (5%); visual acuity reduced (2%); eye pain (1%); cystoid macular edema (1%); corneal edema (1%); and conjunctival hyperemia (1%).

The most common non-ocular adverse reaction that occurred in patients treated with DEXTENZA was headache (1%).

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

*73.6% of physicians in Study 1 and 76.4% in Study 2 rated DEXTENZA as easy to insert.


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VISIT BOOTH 1737 AT ASCRS
Dextenza® (dexamethasone ophthalmic insert) 0.4 mg for intracanicular use

BRIEF SUMMARY: Please see the DEXTENZA Package Insert for full prescribing information for DEXTENZA (11/2018).

1 INDICATIONS AND USAGE

DEXTENZA® (dexamethasone ophthalmic insert) is a corticosteroid indicated for the treatment of ocular pain following ophthalmic surgical procedures.

1.1 Clinical Trials Experience

DEXTENZA was studied in three randomized, vehicle-controlled studies (n = 351). The mean age of the population was 68 years (range 43 to 87 years), 62% were female, and 85% were white. Forty-six percent had brown iris color and 31% had blue iris color. The most common ocular adverse reactions that occurred in patients treated with DEXTENZA were: anterior chamber inflammation involving irids and iridocyclitis (9%); intraocular pressure increased (5%); visual acuity reduced (2%); eye pain (1%); cystoid macular edema (1%); corneal edema (1%) and conjunctival hyperemia (1%).

The most common non-ocular adverse reaction that occurred in patients treated with DEXTENZA was headache (1%).

2 USE IN SPECIFIC POPULATIONS

1.2 Pregnancy

Risk Summary

There are no adequate or well-controlled studies with DEXTENZA in pregnant women to inform a drug-associated risk for major birth defects and miscarriage. In animal reproduction studies, administration of topical ocular dexamethasone to pregnant mice and rabbits during organogenesis produced embryofetal lethality, cleft palate and multiple visceral malformations (see Animal Data).

2.2 Lactation

Systemically administered corticosteroids appear in human milk and could suppress growth and interfere with endogenous corticosteroid production; however the systemic concentration of dexamethasone following administration of DEXTENZA is low (see Clinical Pharmacology (12.3)). There is no information regarding the presence of DEXTENZA in human milk, the effects of the drug on the breastfed infant or the effects of the drug on milk production to inform risk of DEXTENZA to an infant during lactation. The developmental and health benefits of breastfeeding should be considered along with the mother’s clinical need for DEXTENZA and any potential adverse effects on the breastfed child from DEXTENZA.

2.3 Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

2.4 Geriatric Use

No overall differences in safety or effectiveness have been observed between elderly and younger patients.

17 PATIENT COUNSELING INFORMATION

Advise patients to consult their surgeon if pain, redness, or itching develops.

MANUFACTURED FOR:

Ocular Therapeutics, Inc.
Bedford, MA 01730 USA
PP-US-DX-0072

Special Report: ASCRS 2019 MEETING PREVIEW

Program

(Continued from page 6)

ASCRS Foundation Update, Presentation of 2019 Chang Humanitarian Award

The Chang award, which is endowed by Dr. David F. Chang and his wife, Victoria, was created to celebrate and highlight outstanding humanitarian work in the area of cataract blindness. This year’s recipient is Richard L. Litwin, MD.

ASCRS Ophthalmology Hall of Fame Ceremony

The annual ceremony honors the distinguished careers of two inductees and their contributions to ophthalmology. This year’s honorees are Howard V. Gimbel, MD, MPH, and Phillips Thygeson, MD (deceased).

ASCRS Binkhorst Lecture

The Binkhorst Medal is awarded annually to a recipient whose contributions to ophthalmic science and practice have established him or her among the world’s most prominent ophthalmologists. This year, it will be given by Stephen Pflugfelder, MD. His topic will be “The Quest for Tear Stability.”

The Sunday Summit General Session

Sunday, 10 a.m.—noon

Part 1: “ASCRS Lecture on Science, Medicine and Technology”

This lecture was established by ASCRS as a forum for expanding and enriching ophthalmology’s appreciation of fields of science and medicine outside of ophthalmology. This year, it will be given by John Medina, PhD, who is a developmental molecular biologist, researcher, professor, and a New York Times bestselling author. He is an affiliate professor of bioengineering at the University of Washington School of Medicine and is the founding director of the Tarlassignment Institute.

Part 2: “ASCRS’ The Voice of Ophthalmology Season 2”

Hosted by Edward J. Holland, MD, and featuring coaches such as Ike K. Ahmed, MD; John P. Berdahl,
ASCRS INNOVATORS GENERAL SESSION

Monday, 10–11:30 a.m.
This session features the Charles D. Kelman MD, Innovator’s Lecture, to be given this year by Ronald M. Kurtz, MD. His topic will be “Collaborative Innovation.”

37TH FILM FESTIVAL RECEPTION AND AWARDS CEREMONY

Monday, 4:45–6:45 p.m.
Film Festival winners will be announced at this event. A reception begins at 4:45 p.m. and the ceremony will begin at 5:15 p.m.

THE BEST OF ASCRS 2019 GENERAL SESSION

Tuesday, 1–2:30 p.m.
This special wrap-up session will highlight some of the most important and interesting papers presented at this year’s annual meeting from among the “Best Paper of Session” winners.

ASCRS EYEPAC RECEPTION

Friday 7–9 p.m.
Contributors to ASCRS’ non-partisan political action committee, eyePAC, can attend its annual reception at the San Diego Zoo on Friday, from 7 to 9 p.m. It will be held at Sydney’s Grill, located within the Australian Outback/Urban Jungle section of the world-famous wildlife sanctuary. Shuttle transportation will be provided.

WELCOME PARTY

Saturday, 4:30–6 p.m.
The ASCRS and ASOA Welcome Party will be held in the exhibit hall Saturday from 4:30 to 6 p.m. There will be music, complimentary hors d’oeuvres, and refreshments for attendees.

RACE FOR SIGHT

6:30 a.m. start
Run along San Diego’s Harbor in the seventh annual ASCRS 5K Race for Sight, which will be held at 6:30 a.m. on Sunday. Registration fees ($35 plus handling fees) help fund humanitarian eye care through the ASCRS Foundation programs and partnerships. All participants will receive a technical running shirt and a finisher’s medal on race day. This event, sponsored by Johnson & Johnson Vision, has raised more than $100,000 since its inception. To learn more, go to www.tracs.net/ascr5k.

SYMPOSIAS ON SCHEDULE

SATURDAY, 1–2:30 P.M.
“Refractive Cataract Surgery Essentials”

TUESDAY, 8–9:30 A.M.
Best of ASCRS—Presented in Spanish

10 A.M.—NOON
“X-Rounds: Refractive Cataract Surgery to the Max”

ASCRS SUBSPECIALTY DAY

Get even more out of the annual meeting by attending ASCRS Subspecialty Day on Friday before the meeting officially starts. Each will be held from 8 a.m. to 4:30 p.m. One registration gets you admission to all three. Here are the options:

ASCRS Refractive Day, The Pursuit of Ememetropia: This program is an overview of recent advances in refractive surgery, providing innovative techniques and new surgical technologies that will help to improve your outcomes. This is sponsored by the ASCRS Refractive Clinical Committee.

ASCRS Glaucoma Day: This day promises to deliver cutting-edge guidance for expanding your glaucoma treatment options and improving patient outcomes. It is sponsored by the ASCRS Glaucoma Clinical Committee.

Cornea Day: This day includes panel discussions, case studies, debates, and surgical video reviews showcasing the latest innovations. It is sponsored by the ASCRS Cornea Clinical Committee and the Cornea Society.

Visit the Exhibit Hall: The Exhibit Hall is always a fun place to see the latest offerings from throughout the industry, and more than 300 companies will have booths. It will be open Saturday from 9 a.m. to 6 p.m. and Sunday and Monday from 9 a.m. to 5 p.m. Be sure to visit Ophthalmology Times in booth 1604.

ASOA IN SPOTLIGHT

ASOA highlights include its Opening General Session on Saturday from 9 to 11 a.m. Keynote speaker will be Brad Montgomery, who will speak on the topic “Embrace Your Awesomeness.”

Discover ways to achieve untapped productivity and accuracy while creating and sustaining positivity, optimism, and meaningfulness in others.

“Staying Power: Why Your Employees Leave & How to Keep Them Longer” will be part of Sunday’s General Session, from 8:30 to 10 a.m.

The Keynote speaker will be Cara Silletto, MBA, who will share insight on why staffing is so challenging today and how to gain greater staffing stability.

The 2020 ASCRS and ASOA annual meeting will be held May 15 to 19 in Boston.
‘Groovy’ doctor honor

Business model awards, profits from vanity of some physicians

I ADMIT TO BEING one of those arrogant, egotistical, and self-absorbed physicians. This became painfully evident one day, many years ago, when a letter arrived in the mail informing this young ophthalmologist that yours truly had been elected by my fellow physicians as one of the top doctors in the country.

Aside from confirming my faith in the good judgment of my fellow doctors, the letter provided me with the opportunity to send a check to this fine organization with a sharp eye for medical talent. In return for my check, I would receive a plaque, suitable for hanging on the wall where as many passers-by as possible would be forced to view it and realize they were in the presence of medical greatness.

It wasn’t me making the claim. The plaque spoke for the consensus of the medical community when it proclaimed the skills of this humble servant. Little did I know that over the ensuing decades, I would receive multiple opportunities to bask in similar recognitions from organizations that I was deserving of the title of “Best,” “Super,” “Top” or some other adjective suggesting that I possessed whatever stuff gives rise to being a superior healer of eye problems.

Each of these nice letters stroked my ego while also offering me the chance to acquire another plaque. Tempting as it was to accumulate all this proof of the high regard with which I was held in my profession, I didn’t want to make my lack of humility painfully obvious to all and I declined to order any more of these wall decorations.

With age comes a certain amount of skepticism, and the frequency with which I was offered the opportunity to send checks to those who wished to honor me did begin to make me wonder. But I wasn’t being skeptical enough.

In a recent article brought to my attention by a loyal Ophthalmology Times reader, an investigative journalist who publishes on health-care issues was invited to order a plaque for $99 celebrating his being selected as a “Top Doctor.” (This was an attractive opportunity, given that the usual cost was $289.)

According to the article, the reporter inquired how he had been selected to receive this “Top Doctor” designation. The reply came that the awardees are selected by their peers and that there is a research team involved. Beyond that, the specifics were “proprietary.”

The reporter said he was a journalist and was deficient in many of the key elements one associates with a great physician, not the least of which included the lack of a medical school diploma. He then asked if he could still receive the award and buy his plaque. The answer from the employee of the Long Island, NY, company was “yes.”

What is the lesson here?

We can safely conclude the presence of a wall plaque testifying to superb physician qualities indicates the presence of someone with $99 burning a hole in his or her pocket. It does not mean the person necessarily went to medical school.

It also means there is a business model to profit from the ego of doctors. Because so many of the adjectives are already claimed by the plaque-producing companies in New York, Minnesota, and elsewhere, according to the article, I have realized it will be necessary to create a new category of excellence. A quick glance at my thesaurus made it clear that several nice options remain unclaimed, including “magnificent,” “smashing,” and “peerless.”

But I finally settled on a term that has great meaning from my youth. Mail me your check for $99 now to receive your plaque proclaiming you to be a “Groovy Doctor.”

Reference
• https://www.propublica.org/article/top-doctors-award-journalist

By Peter J. McDonnell, MD
director of the Wilmer Eye Institute,
Johns Hopkins University School of Medicine, Baltimore, and chief medical editor of Ophthalmology Times.

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Phone: 443/287-1511 Fax: 443/287-1514
E-mail: pmcdonnell@jhmi.edu

THE CYCLE OF INFLAMMATION IN DRY EYE DISEASE

Ocular Surface Stress

Inflammation

Tear Film Instability

Signs & Symptoms
XIIDRA MAY INTERRUPT THE CYCLE OF INFLAMMATION CENTRAL TO DRY EYE DISEASE\textsuperscript{1,2}

The exact mechanism of action of Xiidra in Dry Eye Disease is not known.\textsuperscript{1}

\textbf{Indication}

Xiidra\textsuperscript{®} (lifitegrast ophthalmic solution) 5\% is indicated for the treatment of signs and symptoms of dry eye disease (DED).

\textbf{Important Safety Information}

Xiidra is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients.

In clinical trials, the most common adverse reactions reported in 5\%-25\% of patients were instillation site irritation, dysgeusia and reduced visual acuity. Other adverse reactions reported in 1\% to 5\% of the patients were blurred vision, conjunctival hyperemia, eye irritation, headache, increased lacrimation, eye discharge, eye discomfort, eye pruritus and sinusitis.

To avoid the potential for eye injury or contamination of the solution, patients should not touch the tip of the single-use container to their eye or to any surface.

Contact lenses should be removed prior to the administration of Xiidra and may be reinserted 15 minutes following administration. Safety and efficacy in pediatric patients below the age of 17 years have not been established.

\textbf{Check out Xiidra-ECP.com}

For additional safety information, see accompanying Brief Summary of Safety Information on the adjacent page and Full Prescribing Information on Xiidra-ECP.com.

References:


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BRIEF SUMMARY:
Consult the Full Prescribing Information for complete product information.

INDICATIONS AND USAGE
Xiidra® (lifitegrast ophthalmic solution) 5% is indicated for the treatment of the signs and symptoms of dry eye disease (DED).

DOSAGE AND ADMINISTRATION
Instill one drop of Xiidra twice daily (approximately 12 hours apart) into each eye using a single-use container. Contact lenses should be removed prior to the administration of Xiidra and may be reinserted 15 minutes following administration.

CONTRAINDICATIONS
Xiidra is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients in the formulation.

ADVERSE REACTIONS
Clinical Trials Experience
Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in clinical studies of a drug cannot be directly compared to rates in the clinical conditions adverse reaction rates observed in clinical studies. Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in clinical studies cannot be directly compared to rates in the clinical conditions adverse reaction rates observed in clinical studies. Therefore, adverse reactions observed in postapproval use of Xiidra may not be directly comparable to rates observed in clinical studies.

Postmarketing Experience
The following adverse reactions have been identified during postapproval use of Xiidra. Rare cases of hypersensitivity, including anaphylactic reaction, bronchospasm, respiratory distress, pharyngeal edema, swollen tongue, and urticaria have been reported. Eye swelling and rash have been reported.

USE IN SPECIFIC POPULATIONS
Pregnancy
There are no available data on Xiidra use in pregnant women to inform any drug associated risks. Intravenous (IV) administration of lifitegrast to pregnant rats, from pre-mating through gestation day 17, did not produce teratogenicity at clinically relevant systemic exposures. Intravenous administration of lifitegrast to pregnant rabbits during organogenesis produced an increased incidence of omphalocele at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the recommended human ophthalmic dose [RHOD], based on the area under the curve [AUC] level). Since human systemic exposure to lifitegrast following ocular administration of Xiidra at the RHOD is low, the applicability of animal findings to the risk of Xiidra use in humans during pregnancy is unclear.

Animal Data
Lifitegrast administered daily by intravenous (IV) injection to rats, from pre-mating through gestation day 17, caused an increase in mean preimplantation loss and an increased incidence of several minor skeletal anomalies at 30 mg/kg/day, representing 5,400-fold the human plasma exposure at the RHOD of Xiidra, based on AUC. No teratogenicity was observed in the rat at 10 mg/kg/day (460-fold the human plasma exposure at the RHOD, based on AUC). In the rabbit, an increased incidence of omphalocele was observed at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the RHOD, based on AUC), when administered by IV injection daily from gestation days 7 through 19. A fetal No Observed Adverse Effect Level (NOAEL) was not identified in the rabbit.

Lactation
There are no data on the presence of lifitegrast in human milk, the effects on the breastfed infant, or the effects on milk production. However, systemic exposure to lifitegrast from ocular administration is low. The developmental and health benefits of breastfeeding should be considered, along with the mother’s clinical need for Xiidra and any potential adverse effects on the breastfed child from Xiidra.

Pediatric Use
Safety and efficacy in pediatric patients below the age of 17 years have not been established.

Geriatric Use
No overall differences in safety or effectiveness have been observed between elderly and younger adult patients.

NONCLINICAL TOXICOLOGY
Carcinogenesis, Mutagenesis, Impairment of Fertility
Carcinogenesis: Animal studies have not been conducted to determine the carcinogenic potential of lifitegrast.

Mutagenesis: Lifitegrast was not mutagenic in the in vitro Ames assay. Lifitegrast was not clastogenic in the in vitro mouse micronucleus assay. In an in vitro chromosomal aberration assay using mammalian cells (Chinese hamster ovary cells), lifitegrast was positive at the highest concentration tested, without metabolic activation.

Impairment of fertility: Lifitegrast administered at intravenous (IV) doses of up to 30 mg/kg/day (5400-fold the human plasma exposure at the recommended human ophthalmic dose [RHOD] of lifitegrast ophthalmic solution, 5%) had no effect on fertility and reproductive performance in male and female treated rats.
MANAGING UNIQUE CHALLENGES OF PEDIATRIC CONGENITAL CATARACT

Microinstrumentation provides surgeons increased control

By Florian T.A. Kretz, MD, FEBO; Special to Ophthalmology Times

Opacification of the crystalline lens can lead to vision loss and an impaired quality of life for any patient. In pediatric congenital cataract, this can be a frightening experience for the child and treatment will involve both patient and parents.

"Pediatric cataract surgery is different from adult cataract surgery, mainly due to the small size of the child’s eye, with an axial length of 16.4 mm instead of 24 mm on average in adults, and the anterior chamber is only about 2 mm deep," said Hee-Jung Park, MD, MPH, assistant professor of ophthalmology, Zanvyl Krieger Children’s Eye Center, Wilmer Eye Institute, Johns Hopkins University School of Medicine, Wilmer Eye Institute, Baltimore.

The low scleral rigidity makes it difficult to maintain the chamber during surgery. In children, the sclera is about four times more pliable and has only half the tensile strength of the adult sclera.1

“Pacification of the crystalline lens can lead to vision loss and an impaired quality of life for any patient. In pediatric congenital cataract, this can be a frightening experience for the child and treatment will involve both patient and parents.”

Case Experience

To date, congenital cataract has been one of the most challenging surgeries I have performed. Two of my cases discussed here were both challenging and difficult. However, I have found that microinstruments (MicroSurgical Technology [MST]) deliver a confident ability to perform a smoother, more-controlled surgery.

David Yorston, FRCophth, Moorfield’s Eye Hospital, London, suggests that the exact cause may be unknown for many cases of childhood cataract, but there can often be associated systemic condition, such as:
- Prenatal (intrauterine) infection, e.g., rubella, cytomegalovirus, syphilis.
- Prenatal (intrauterine) drug exposure, e.g., corticosteroids, vitamin A.
- Prenatal (intrauterine) ionizing radiation, e.g., x-rays.
- Prenatal (intrauterine) metabolic disorder, e.g., maternal diabetes.
- Hereditary (isolated - without associated eye or systemic disorder), e.g., autosomal dominant inheritance.
- Hereditary with associated systemic disorder or multisystem syndrome.
- Chromosomal, e.g., Down’s syndrome (trisomy 21), Turner’s syndrome.
- Skeletal disease or muscle disorder, e.g., Sticker syndrome, Myotonic dystrophy.
- Central nervous system disorder, e.g., Norrie’s disease.
- Renal disease, e.g., Lowe’s syndrome, Alport’s syndrome.
- Mandibulo-facial disorder, e.g., Nance-Horan cataract-dental syndrome.
- Dermatological disorder, e.g., congenital ichthyosis, Incontinentia pigmenti.

Where unilateral cataracts are not inherited or associated with a systemic disease, they are usually the result of local dysgenesis and may be associated with other ocular dysgenesis, such as persistent fetal vasculature (PFV), posterior lenticulons, or lentiglobus.

**CASE 1: UNILATERAL CONGENITAL CATARACT**

A 6-year-old boy presented to me with unilateral congenital cataract with a refraction of +8 D and a preoperative best-corrected distance visual acuity (CDVA) of 0.5 logMAR.

After having been sent away from two other clinics, the child’s parents approached me looking for a solution to their child’s vision problems.

Cataract surgery in such a case is challenging because of added issues, such as increased scleral elasticity, thicker corneas, and eye rubbing.

Adding to the challenge, during surgery, children placed under general anesthesia tend to turn up their eye globe which makes the anterior segment of the eye squashed for space. With limited space, the surgery can be difficult.

Postoperatively, other issues such as reduced compliance with activity restriction, and the effect of postoperative astigmatism on amblyopia also must be considered.

**take-home**

- Pediatric cataract surgery presents challenges for surgeons due to the small size of the child’s eye. Low scleral rigidity also makes it difficult to maintain the chamber during surgery.

**FIGURE 1** A 23-gauge Seibel capsulorhexis forceps was used for opening of the capsule in the shallow anterior chamber. (Image courtesy of MicroSurgical Technology)

**Continues on page 14:**

Cases

**APRIL 15, 2019 :: Ophthalmology Times**
IOL selection was also a challenge because the child was hyperopic. The choice of lens power is paramount to visual rehabilitation and a lens that leaves a blurred retinal image should be avoided. The choice of IOL power should be individualized based on the child’s need and refractive status of the other eye in unilateral cases. In recent years, acrylic IOLs have gained popularity over polymethyl methacrylate (PMMA) IOLs, which had remained the IOL of choice for many years.5,6

In children, hydrophobic acrylic IOLs are considered better than PMMA IOLs in terms of greater biocompatibility and smaller incision size with use of foldable design, with late onset and a lower rate of posterior capsule opacification (PCO) formation. Hydrophobic acrylic IOLs are used by 93% of pediatric cataract surgeons.7

In children with uveitic cataracts, decreased postoperative inflammation has been reported with the use of heparin-surface-coated PMMA IOLs.8

I targeted this case as slightly hyperopic, matching the refraction of the fellow eye. The IOL (IC-8, AcuFocus) had a power of +27.5 D, and a target refraction of +1.32 D, using the Hofler Q formula. An iris hook was used to gently open the iris due to posterior synchiae and pupil dysgenesis.

Microforceps had to be used through different side ports. A forceps (23-gauge Seibel Capsulorhexis Forceps, MicroSurgical Technology) was used for opening of the capsule in the shallow anterior chamber (Figure 1, Page 13). This instrument is designed to minimize ophthalmic viscosurgical device (OVD) loss to maintain stable anterior chamber, as well as provide greater visibility and control of capsulorhexis, especially in eyes with a shallow anterior chamber.

As the shaft is stable, the branches can be moved to allow optimal control over the capsulorhexis.

Surgery was successful, and postoperative results are illustrated in Table 1. At the 12-week postoperative visit, manifest refraction was measured as +4.00/-3.00 × 43, with a corrected visual acuity of 0.15 logMAR at distance and 0.1 logMAR at near.

With the last visit in October, the patient and his parents are satisfied with the results and refraction has decreased to +3.00/-2.50 × 52 and a corrected visual acuity of 0.2 logMAR at distance.

The surgery was performed in 2016, and the follow-up was 18 months postoperatively.

**CASE 2: UVEITIC PATIENT WITH CATARACT**

A 5-year-old boy had a unilateral congenital cataract. Like the first child, he had been turned away from a clinic and a university for treatment. He had uveitis with pupillary membrane. The whole pupil was clogged with a dense fibrin membrane.

The boy’s vision had been decreased to hand movements from 0.5 logMAR over the previous 24 months.

During surgery (Figure 2), I used the 23-gauge, curved scissors (Hoffman/Ahmed horizontal curved scissors, MicroSurgical Technology) (Figure 3) to cut the pupillary membrane and inserted a Malyugin Ring 2.0, which was easy to use, expanding the pupil up to 6 mm and protecting the iris from damage.9

I proceeded with the irrigation port and performed the anterior capsulotomy with the capsulotomy system (Zepto, Mynosys) to open the lens capsule and perform the cataract surgery. The IOL (CT Lucia 211P, Carl Zeiss Meditec) with a power of +28 D was implanted, with a target refraction of +0.35 D using Barrett formula.

For this surgery, I chose this IOL type because it is hydrophobic acrylic IOL with imbedded heparin surface coating to prevent further inflammation. With the capsulotomy system, an element surrounded by a silicone plastic shell is attached to a suction tube, and introduced into the eye via a tiny incision (2.2 to 2.4 mm).

As Mark Packer, MD, suggests, the silicone shell squeezes down and there is a push rod inside the silicone sleeve used to expand the ring to a circle, and nitinol retains it back to a circle. Pulling the push rod out, you retract it and turn on the suction and the whole thing sucks itself down onto the anterior capsule.10

The capsulotomy system is fast and easy to use and offers a precise capsulotomy opening with a higher stability compared with manual capsulotomy.

In the anterior chamber, I carefully grabbed the pupillary membrane in the center and lifted it. Then I made a hole at the iris membrane margin and filled viscoelastic behind the pupillary membrane and went in with the instrument to loosen any deposits (synchiae).
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Behind the membrane, then filled it up again with viscoelastic so the membrane comes up in the anterior chamber.

From the left side port, I entered again with 23-gauge, micro-holding forceps (Figure 4, Page 14), lifted up the membrane, and on the other side, I came in with the curved scissors (Hoffman/Ahmed), which are exchangeable.

When dealing with complicated cases, I find it much easier to use the MST handle, which is compatible with all exchangeable single-use heads that can be opened from the packaging when needed.

With the exchangeable 360 handle (MST), the direction of the instrument can be turned, so I was able to cut around the whole pupil just by turning the scissors in the right direction.

This benefit allowed flexibility and ease of procedural use. The development of fine-gauge instruments, especially the scissors and forceps, helps in chamber stability.

At one day postoperatively, uncorrected vision was measured as 0.5 logMAR. At postoperative day four, best-corrected visual acuity was 0.2 logMAR. The child has chronic uveitis, for which he is prescribed topical steroid treatment, but overall his vision has vastly improved from hand movements before surgery. Therefore, his quality of life has improved.

At three months after surgery, the uveitis was under control with topical dexamethasone drops, uncorrected visual acuity is 0.4 logMAR which is improved to 0.2 logMAR with correction.

The child’s mother has reported being very happy with the surgical outcomes.

Possible complications or risks postoperatively include glaucoma, retinal detachment, infection, and the need for more surgeries.

‘Possible complications or risks postoperatively include glaucoma, retinal detachment, infection, and the need for more surgeries.’ – Florian T.A. Kretz, MD, FEBO

References

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DEEP PHENOTYPING is shedding new light on congenital corneal opacities, said Kanwal K. Nischal, MD, FAAP, FRCPht.

Along with the initial diagnoses, physicians should also delve deeper to avoid overlooking the causes of some ocular anomalies, said Dr. Nischal, professor, School of Medicine; chief, Division of Pediatric Ophthalmology and Strabismus, and vice chairman, Department of Ophthalmology, University of Pennsylvania Medical Center, Children's Hospital of Pittsburgh.

Acronyms such as STUMPED—Sclerocornea, Tears in Descemet’s [trauma], Ulcer, Metapioplyascharidosis/metabolic, Peter’s anomaly, Edema: Congenital hereditary endothelial dystrophy, and Dermoid—have been used to define factors that comprise congenital corneal opacities.

This understanding of congenital opacities has expanded with implementation of imaging that is providing better insights into the pathology, he added.

“Essentially, neonatal corneal opacities are either a primary developmental problem of the cornea or a secondary corneal disease,” Dr. Nischal said.

CORNEAL DISEASES
Primary corneal diseases—such as corneal dystrophies, corneal structural defects resulting from dermoids, and CYP1B1 cytopathy—and secondary corneal diseases—such as iridocorneal lesions and acquired corneal diseases, such as metabolic issues, trauma, infectious and non-infectious keratitis, and others such as keratoconus—can be treated successfully with penetrating keratoplasty, Descemet stripping endothelial keratoplasty, or deep anterior lamellar keratoplasty.

In cases in which the lens fails to separate from the cornea or lens separation occurs but the lens fails to form, the prognosis is not good with these surgeries.

Dr. Nischal advocates deep phenotyping to get to the root of a problem.

He avoids the use of the terms “sclerocornea” and “Peter’s anomaly” and explained why. He described a case of aphakia that was referred to him with the diagnosis of sclerocornea. Following ultrasound biomicroscopy and a corneal transplant, he found that rather than the lens being adherent to the cornea as had been expected, histologic study showed that the lens failed to separate from the cornea and was actually embedded in the cornea embryologically.

“The success of surgery in this eye was limited because the vitreous was abnormal,” he explained. “When this is the case, many other structures in the eye also are abnormal.”

In cases with iridocorneal adhesions, also referred to as Peter’s anomaly type 1, the surgical success rate is good. However, some cases can be exceptions to that rule, Dr. Nischal said.

Peter’s-plus syndrome is caused by mutations in the B3GALTL gene, a glycosylation gene. Dr. Nischal described three children with the diagnosis. In two patients, caviation of the posterior stroma and iridocorneal adhesions were seen. The third patient also had those abnormalities in one but the second eye had a keratolenticular adhesion.

“This indicates that in the same child with the same gene defect the phenotype can be different in the two eyes,” he emphasized. “When a patient presents with congenital corneal opacities, those opacities are a defect in the final pathway and they are not a diagnosis.”

Diagnosing a child with sclerocornea or Peter’s anomaly is not helpful. In this child, one eye did badly and developed a retrocorneal membrane and one eye did well, he added.

In another case diagnosed with Peter’s anomaly, which normally would have fared well with a corneal transplant, delving deeper into the phenotype revealed another problem.

Dr. Nischal explained that a form of keratoirido-lenticular dysgenesis is characterized by a mechanical dysfunction resulting from, for example, persistent hyperplastic primary (PHPV). In this patient, imaging showed that the lens was touching the cornea and pushing the ocular structures forward with no disruption of the Descemet endothelial interface. Doppler ultrasound revealed PHPV.

He addressed this by entering the eye at the limbus to decompress the lens. With removal of the lens material, the lens capsule still remained attached to the posterior cornea and the PHPV pushed the lens forward. Four months postoperatively, the patient can wear a contact lens and no corneal transplant was needed.

“If the diagnosis had stopped at Peter’s anomaly, a corneal transplant would have been considered rather than consideration of a mechanical process,” he said.

GETTING RESULTS
Another example of the importance of deep phenotyping was a case reported by Yu Qiang Shu, MBBS, and Jodhbir Mehta, MBBS, in which a central opacity was present and a posterior stroma was missing (Cornea. 2018;37:382-385).

In this case, Dr. Mehta opted for selective endothelial removal in the area of the missing posterior stroma. Five months after surgery, the cornea was clear.

“In this case, if deep phenotyping was not done, and the diagnosis was based on one defect without seeking any extra information, selective endothelial removal would not have been possible,” he said. “The procedure clearly works, but not in every case.”

In a final case that again demonstrated the importance of delving deeper into the phenotype, Dr. Nischal described a patient who previously had been denied corneal transplants at five institutions. Following imaging that disclosed abnormal palisades of Vogt, the child the transplants were performed and 6 months after surgery, the eyes remain epithelialized.
Discerning among clinical etiologies of pediatric conjunctival tumors

Agents can predispose tissue to tumors of epithelial, melanocytic, stromal origins

By Lynda Charters; Reviewed by Jacob J. Pe’er, MD

CLINICIANS KNOW the conjunctiva to be a thin, translucent, vascularized mucous membrane comprised of numerous elements, said Jacob J. Pe’er, MD.

Because the tissue is external, it is exposed to chemical, physical, and biologic agents that can predispose the tissue to tumors of epithelial, melanocytic, and stromal origins. The vast majority of tumors in children arise from the first two.

“Most conjunctival tumors in children are rare and usually benign and include epithelial tumors, such as squamous papillomas and nevi,” said Dr. Pe’er, the Jonas Friedenwald Professor of Ophthalmic Research, Department of Ophthalmology, Hadassah-Hebrew University Medical Center, Jerusalem.

“The rare malignant tumors, such as melanoma and lymphoma, are usually larger and develop in older children,” he added. “Xeroderma pigmentosa may cause malignant conjunctival tumors in children.”

Evaluation of patients who present with a conjunctival abnormality includes an external ocular examination, slit lamp examination, fluorescein or rose bengal staining, documentation by drawing or photography, and histopathologic diagnosis.

TUMORS

CONGENITAL MELANOCYTIC NEVI

Among these, the junctional nevus develops almost exclusively in children and adolescents. According to Dr. Pe’er, other growths, such as the compound nevus, the inflamed juvenile conjunctival nevus, and congenital melanosis, and racial melanosis, which fall under this classification, are not actual tumors.

CONJUNCTIVAL JUNCTIONAL NEVI

Conjunctival junctional nevi are noteworthy in that they are the only stage that appear in children and young adolescents, and they appear primarily in the bulbar juxtalimbal conjunctiva.

They can be misdiagnosed as primary acquired melanosis, which develops only in adults. These appear as focal, flat, well-circumscribed lesions that move freely over the ocular surface. Treatment is periodic observation and excision upon enlargement.

INFILTRATED JUVENILE CONJUNCTIVAL NEVI

Inf inflamed juvenile conjunctival nevi are important considerations in young patients. These are compound nevi that appear only in children and young adolescents. The nevi look inflamed; most are amelanotic and related to symptomatic or asymptomatic conjunctival allergy. The nevi may be worrisome with rapid growth and congestion.

CONGENITAL MELANOSIS OCULI, OCULODERMAL MELANOCYTOSIS

These are not actual tumors, but they must be considered because of the potential for development of uveal melanoma.

STROMAL TUMORS

These tumors can be both benign and malignant. Among them, the two main types are pyogenic granulomas and various types of vascular anomalies, such as hemangiomas. Pyogenic granulomas can appear after surgery.

Of the fibrous tumors, which include fibromas, fibrous histiocytomas, which are benign in children, and nodular fasciitis, benign fibrous histiocytomas can present in the pediatric population.

Histiocytic tumors include juvenile xanthogranuloma, which can be difficult to treat, Dr. Pe’er said.

Rhabdomyosarcoma is a form of myogenic tumor that can be associated with the orbital manifestation of the disease. Juvenile conjunctival xanthogranuloma appears as a single orange-pink stromal mass that often develops near the limbus.

Histopathologic evaluation shows histiocytes and Touton giant cells; this tumor may resolve spontaneously. Treatment can include excision, administration of local or systemic corticosteroids, and brachytherapy.

Other tumor types are lipomatous tumors and lymphoproliferative tumors. The former include herniation orbital fat that are not uncommon. In children, the latter include usually benign reactive lymphoid hyperplasia, rarely usually low-grade lymphoma that can be diagnosed by immunohistochemistry and molecular pathology.

Hamartomas and choristomas usually are diagnosed first in children and include dermoids, dermalipomas, osseous choristomas, lacrimal gland choristomas, and complex choristomas. These are congenital lesions that are treated based on their size and any resulting functional disturbance.

Caruncular tumors arise from both the conjunctival tissue and from the epidermis and skin appendages.

Xeroderma pigmentosum, which is characterized by extreme sensitivity to sunlight, is in-
A STUDY focusing on corneal endothelium changes found that an elderly Hispanic population had a high prevalence of polymegatism, pleomorphism, and guttata, said Jorge Luis Domene Hickman, MD.

The results could help to indicate future corneal pathologies that may occur, said Dr. Hickman, Ophthalmology and Visual Sciences Institute, School of Medicine, Monterrey Institute of Technology and Higher Education, Monterrey, Mexico.

DIVING DEEPER
A total of 42 patients (22 male, 20 female) and 75 eyes were included in the study. All of the patients were at least 65 years old, with a mean age of 73.9 years.

Researchers assessed the central region of the corneal endothelium with specular microscopy (EM-3000, Tomey) to calculate the study’s corneal parameters, including corneal pachymetry.

Study participants were classified in 5-year age ranges, such as 65 to 69 years, 70 to 74 years, etc. All eyes in the study were healthy. Exclusion criteria included previous ocular surgery, glaucoma, and photocoagulation, Dr. Hickman said.

Polymegatism was considered when the coefficient of variation of the cell area was higher than 40%. Pleomorphism was considered when fewer than 50% of the cells were six-sided.

ANALYZING RESULTS
The mean cell density among patients was 2,268 cells/mm², with no statistically significant difference between males and females (p = 0.15).

The mean corneal thickness was 0.537 mm. The mean coefficient of variation was 42.04%; 44% of eyes had signs of polymegatism. The mean percentage of six-sided cells was 42.3%, with 76% of eyes having pleomorphism.

Also, 27% of patients had significant guttata.

Three patients in the study were diagnosed with Fuchs’ endothelial dystrophy—all of whom had polymegatism and pleomorphism as well as a mean cell density of 1,152 cells/mm².

UNEXPECTED ‘SURPRISE’
A surprise occurred among the nine patients who were aged more than 85 years, Dr. Hickman said. They had an above-average mean cell density of 2,404 cells/mm². They also had a coefficient of variation of 36.9%, hexagonality of 46.6%, and pachymetry of 0.545 mm.

Such research is useful for ophthalmologists who see patients with a Latin-American background, Dr. Hickman said.

“Knowledge of the characteristics of the corneal endothelium is important to take the adequate measures during anterior segment surgery and to predict the evolution afterward,” he concluded. “These characteristics vary depending on patient ethnicity.”

TUMORS
(Continued from page 19)

An elderly Hispanic population had a high prevalence of polymegatism, pleomorphism, and guttata. The results could help indicate future corneal pathologies that may occur, according to researchers.

(Images courtesy of Jorge Luis Domene Hickman, MD)

Healthy Pleomorphism Polymegatism Guttata

A high prevalence of polymegatism, pleomorphism, and guttata were seen in a study of corneal endothelium changes among an elderly Hispanic population.

Tumors occur as a result of a mutation in one of eight genes involved in nucleotide excision repair. The eyes are involved in about 20% of cases and the involvement is limited to eyelids, conjunctiva, and cornea exposed to the sun.

Dr. Pe’er noted that the most relevant factor is that the patient is predisposed to develop multiple neoplasms of the eyelid and ocular surface, such as basal cell and squamous cell carcinoma and melanoma.

TUMORS
(Continued from page 19)

Hereditary as an autosomal recessive trait with full penetrance. The disease occurs alone as the result of a mutation in one of eight genes involved in nucleotide excision repair.

The eyes are involved in about 20% of cases and the involvement is limited to eyelids, conjunctiva, and cornea exposed to the sun.

Dr. Pe’er noted that the most relevant factor is that the patient is predisposed to develop multiple neoplasms of the eyelid and ocular surface, such as basal cell and squamous cell carcinoma and melanoma.

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This article was adapted from Dr. Pe’er’s presentation during Cornea Subspecialty Day at the 2018 meeting of the American Academy of Ophthalmology. Dr. Pe’er has no financial interests to disclose related to this report.

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By Vanessa Caceres; Reviewed by Jorge Luis Domene Hickman, MD
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1 Data on File.
Researchers explored messenger RNA in pediatric cataracts linked to multiple genes associated with pediatric cataracts.

**FIVE CATEGORIES**

The study classified pediatric cataracts into five different categories.

Congenital cataracts were classified as either infectious, associated with rubella, cytomegalovirus, or a combination of the two infections, or noninfectious, whether linked with an inherited condition or lens opacification due to posterior capsular anomalies.

Acquired cataracts were classified as postnatal, cataracts which developed anytime during childhood after the first birthday, secondary cataracts that developed following other ocular diseases such as uveitis, or traumatic cataracts.

Three types of genes are known to be associated with pediatric cataracts. Structural genes maintain transparency of the lens. Transcription factor genes play roles in lens development. Fibrotic genes maintain the physical integrity of the lens.

Researchers conducted a prospective cross-sectional study using lens material extracted during routine cataract surgery on 90 patients younger than 16 years of age. There were eight study groups, postnatal cataract (nine patients), secondary cataracts (13 patients), traumatic cataracts (13 patients), rubella cataracts (nine patients), rubella + CMV (eight patients), CMV cataracts (nine patients), prenatal cataracts (nine patients), and posterior capsular anomalies (10 patients).

A control group of 10 patients had clear subluxated lenses.

Among the structural genes, only AQP-0 and CRYG-C are highly expressed in infectious CMV and prenatal cataracts, Dr. Matalia noted, concluding that prenatal cataracts likely derive from transcriptional hyperactivity of AQP-0 and CRYG-C. HSPA-4 appears to play no role in the development of prenatal cataracts.

Among the transcription factor genes, TDRD-7 is expressed in the CMV group, supporting the involvement of both AQP-0 and CRYG-C. This same pathway is inhibited in rubella cataracts. FOXE-3 also shows higher expression in the prenatal group, but PITX-3 and MAF expression is similar to the control group.

Fibrotic gene expression shows a significant decrease in both the rubella and rubella + CMV groups, suggesting that the fibrotic pathways seen in other tissues do not contribute to the formation of cataracts in younger patients.

“This is the first preliminary study to talk about gene expression in lens matter from pediatric human cataracts,” Dr. Matalia said. “There is definitely a correlation between gene expression and cataract morphology. If we are able to find the precise pathway and a drug to block it, we can modify gene expression using target-specific therapy.”

**LEN S STRUCTURAL GENES**

The group explored three lens structural genes, including:

- AQP-0 is responsible for aquaporin-0, a protein which maintains lens transparency. Defects in this protein can result in inherited cataracts and congenital glaucoma.
- HSPA-4 is responsible for heat shock protein A-4, found in lens epithelium and fibers. Mutations are reported to result in inherited cataracts.
- CRYG-C is responsible for crystallin gamma-C, a protein which maintains lens transparency. Mutations are associated with autosomal dominant nuclear cataracts.

Four lens transcription factor genes were also included. They are:

- MAF codes for musculoaponeurotic fibrosarcoma oncogene, which is involved in the regulation of crystallins. Defects cause cataracts and anterior segment dysgenesis.
- TDRD-7 codes for Tudor domain containing protein 7, which regulates genes critical for lens development. Defects can give rise to cataracts, microcornea and coloboma.
- FOXE-3 codes for forkhead box 3, which may play a critical role in lens development. Defects have been associated with cataracts as well as anterior segment dysgenesis.
- PITX-3 codes for pituitary homeobox 3, also suspected of playing a critical role in lens development. Defects have been associated with cataracts and anterior segment abnormalities.

Four genes have been associated with profibrotic factors. These factors are typically seen in a fibrotic cascade in skin and other tissues, Dr. Matalia said, and might be active in cataract formation. These genes include:

- TGF-β codes for transforming growth factor beta.
- α-SMA codes for alpha smooth muscle actin.
- VIM codes for vimentin.
- BMP-7 codes for bone morphogen protein-7.
T

hough complications are rare with SMILE, suction loss can occur early on in the surgical procedure when the eye is docked. Being aware of the causes of suction loss and how to avoid it in the beginning of a surgeon’s “SMILE career” are imperative.

However, even if suction loss occurs, it can be easily managed without a negative effect on patients’ visual outcomes.

I will outline the different stages of SMILE when suction loss can occur and introduce protocols for managing this rare complication.

**CAUSES OF SUCTION LOSS**

The incidence of suction loss in SMILE varies between 0.5% to 4.4%, which decreases with surgical experience.1–4

In our clinic at Beyoglu Eye Training and Research Hospital, Istanbul, Turkey, the suction loss rate is about 1%. The risk factors are sudden eye or head movement, patient anxiety, a longer suction time, and Bell’s phenomenon.

**SUDDEN EYE OR HEAD MOVEMENT**

To avoid sudden eye or head movement, I instruct patients to focus on the fixation light during docking. I tell them this light will disappear when the procedure starts, and they should keep looking at the same direction, not searching for the light. Thus, I can prevent the sudden eye movements.

Head position is crucial during docking; contact with the nose or pressure on it might cause discomfort for the patients, especially for those with deep orbits. This may cause sudden head movements and suction loss during the procedure.

Proper placement of the head increases the success. Therefore, small rotation of the head before the procedure might be necessary for the patients with possible nose contact, especially for those with deep orbits.

**PATIENT ANXIETY**

To reduce patient anxiety, I brief patients on every detail of the SMILE procedure. I start by informing them of our experience performing SMILE. The first SMILE procedure was performed in our clinic in 2012 by Professor Ahmet Demirok.

Since then, we have performed SMILE in almost 1,500 eyes of 800 patients. I also offer my patients the opportunity to watch other patients’ surgical videos. In cases where anxiety is high, I administer anxiolytic medication, such as Alprazolam, 20 minutes before surgery.

Also, it eases patients’ fears when I inform that that we have performed SMILE on our relatives, colleagues, and friends.

I say, “My wife also had this procedure, our ophthalmologist, some of my residents, and even our last hospital manager’s daughter.” If we share these details, they trust me, they trust our clinic, and we reduce anxiety.

**LONGER SUCTION TIME**

The time required to create the flap cuts is much shorter in LASIK surgery compared to that of SMILE.

If the suction takes a long time, or if the docking cannot be achieved at the first attempt, the risk of suction loss increases.

Repeated docking attempts might cause the loose conjunctiva to interfere with the suction. I believe this situation might be related to the experience of the surgeon and may improve over time.

There are different modes of the femtosecond laser (ReLEx SMILE; Carl Zeiss Meditec) such as standard/fast/expert depending on the laser parameters, which change the laser application time.

In addition, when a larger optic zone is preferred, it might also prolong the suction time. All of these factors should be considered.

Continues on page 24: SMILE
‘In my clinic, most suction loss occurred during the first several cases, which we attribute to the learning curve associated with SMILE.’ – Yusuf Yildirim, MD

**SMILE**

(Continued from page 23)

**BELL’S PHENOMENON**

Bell’s phenomenon is a reflex in which the patient’s eye turns upward and outward when the eyelid is closed to avoid corneal exposure. The movements caused by this condition during SMILE can lead to sudden suction loss. Bell’s phenomenon is actually a normal reflex. In order to prevent it, we instruct the patient to open both eyes, to stay relaxed and to try not to close the fellow eye. By this way, we might decrease the risk of suction of loss related to Bell’s phenomenon.

**MANAGING STAGES OF SUCTION LOSS**

The SMILE procedure is comprised of three steps: docking, creating the lenticule, and extracting the lenticule.

When creating the lenticule with the femtosecond laser, there are four stages. When suction loss occurs, the procedure must be stopped. Suction loss can be experienced at four stages of creating the lenticule. These are the refractive cut, the side cut, the cap cut, and the incision cut.

**REFRACTIVE CUT**

The first stage of creating the lenticule is the refractive cut.

The femtosecond laser starts the refractive cut peripherally. If a surgeon observes suction loss in this stage at smaller than 10% progress, the surgeon should re-dock and start the SMILE procedure again.

However, re-centering at the exact same location is crucial to success. Losing suction at this stage is rare. If the surgeon progresses at more than 10%, he or she should convert to a femtosecond laser-assisted LASIK operation by performing a corneal flap and then beginning the LASIK procedure.

**SIDE CUT**

The second stage of creating the lenticule is the side cut.

If the surgeon loses suction during an incomplete lenticule side cut, he or she should perform re-docking and re-centering at the exact same location to continue with SMILE.

At this stage, the surgeon should reduce the lenticule diameter. The approximate adjustment is 0.4 mm. Lenticule side cut thickness should be increased about 10 to 20 μm. Next, ensure that the entire right base of the lenticule is reached after re-suction.

**CAP CUT**

The third stage of the lenticule creation is the cap cut stage. If there is an incomplete cap cut, the surgeon should re-dock and continue the procedure.

In this situation, the surgeon can reduce the cap diameter with a maximum adjustment of 0.4 mm.

**INCISION CUT**

If suction loss occurs in the final stage, the incision cut stage, the surgeon can re-dock and continue the procedure.

The surgeon can reduce the cap diameter with a maximum adjustment of 0.4 mm. Some clinicians can adapt the adjustment to clinical requirements. The cap side cut should be adjusted because of potential corneal swelling, and the surgeon should increase it approximately 10 to 20 μm.

**CONCLUSION**

In my clinic, most suction loss occurred during the first several cases, which we attribute to the learning curve associated with SMILE.

Out of the almost 1,500 eyes that we have performed SMILE on, 13 eyes have experienced suction loss, and 8 of those occurred during the first 100 cases. The remaining five were during the cases that followed and we have not observed any suction loss during the lenticule cut stage. (Figure 1, Page 23).

The risk of suction loss is low and can be reduced by heightened awareness. Most of the causes of suction loss can be avoided by the surgeon.

Even if suction loss occurs, it can be managed easily and there is no effect on long-term visual outcomes for the patient.

**References**


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Dr. Yildirim did not disclose any financial interests relevant to the subject matter.
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Primary posterior optic capture offers many advantages in cataract surgery

Approach enables patients to maintain best possible vision with one-time only procedure

By Cheryl Guttman Krader; Reviewed by Lisa B. Arbisser, MD

HYALOID-SPARING primary posterior optic capture should one day be routine in cataract surgery because it enables patients to maintain the best possible vision with a one-time only procedure, according to Lisa B. Arbisser, MD.

“Posterior optic capture with IOL haptics in the bag and the optic prolapsed through a posterior capsulotomy into Berger’s space allows a clear visual axis for life even when done in the pediatric age group without anterior vitrectomy and in all adults, truly turning cataract surgery into a premium procedure,” said Dr. Arbisser, adjunct professor, Moran Eye Center, University of Utah, Salt Lake City.

This technique reduces retinal straylight produced by the “clear” posterior capsule, resulting in better initial vision, she added.

The technique “eliminates risk of secondary visual degradation from posterior capsule opacification (PCO) and therefore the need for planned anterior vitrectomy in children and hyaloid busting Nd:YAG laser posterior capsulotomy in adults,” Dr. Arbisser said.

“It obviates the need for a square-edged optic because the square edge is only necessary to retard PCO when the IOL is in the bag,” she added.

In addition, it can also eliminate the dysphoria that is related to the square-edge design.

As another benefit, it brings predictability to the effective lens position by reducing or eliminating lens epithelial cell fibrosis and contraction, and eliminates the risk of postoperative rotation when using a toric lens, Dr. Arbisser noted.

REASONABLE LEARNING CURVE Performing posterior optic capture involves some extra time and skill, but the added time is minimal, just about 1 to 2 minutes, and the learning curve is not too challenging, Dr. Arbisser noted.

Surgeons should expect to perform about 150 cases to reach the expert-level, she added.

“The main hurdle may be more of a mental block, as we were always taught not to break the posterior capsule at all costs,” she added.

The best cases to offer posterior optic capture initially are for patients who cannot sit for a Nd:YAG laser capsulotomy and require general anesthesia for cataract surgery, Dr. Arbisser said.

““This is the cohort that benefits the most from one surgical procedure providing permanent clarity of vision for life,” she said.

SURGICAL STEPS Describing her technique—taught to her by Rupert Menapace MD, Vienna, Austria—Dr. Arbisser said that after cataract removal and placing an ophthalmic viscosurgical device (OVD) in the sulcus, she uses a 30-gauge needle positioned bevel up to lift the 5-μm thick posterior capsule from the anterior hyaloid and create a posterior capsule flap initiating the rhexis. Then, a cohesive OVD is injected through the posterior capsule opening to push the hyaloid posteriorly and make Berger’s space real.

“The OVD remains in Berger’s space, which is the space between the posterior capsule and the anterior hyaloid, and in the sulcus, creating a planar area to work in with the anterior and posterior capsules ‘pancaked’ together,” Dr. Arbisser said.

Performing the posterior capsulotomy is not difficult, but compared with doing an anterior capsulorhexis, it requires that surgeons use higher magnification, a little more centripetal force, and more frequent regrasping because of the elasticity of the posterior capsule.

“There is no tendency for the tear to run out, because there is no convexity to the posterior capsule, the tear obeys the vector force applied to it,” Dr. Arbisser said.

The anterior capsulorhexis is used as a guide

CONTINUES ON PAGE 27: Technique
“Most of these babies are left aphakic with contact lenses used for a secondary IOL is placed in the pre-school years,” he said. “Even when an infant is implanted with an IOL, a vitrectomy should still be done, and so I am uncertain of the value of adding posterior optic capture.”

For the older children (Group 3, aged 8 and older), posterior optic capture is likely not necessary.

“In those children, in-the-bag IOL placement along with a primary posterior curvilinear capsulorhexis without vitrectomy has worked well for keeping the visual axis clear, even without optic capture,” Dr. Wilson said.

“I am an advocate of primary posterior capsulorhexis or capsulectomy even in older children since it avoids the situation where Nd:YAG laser capsulotomy becomes necessary to treat posterior capsule opacification, but then vitrectomy is also needed to clear the youthful formed vitreous of capsular debris that does not move out of the visual axis after the laser capsulotomy,” he added.

Dr. Wilson noted that pars plana posterior capsulectomy and planned anterior vitrectomy is safe and effective for young children with a very low complication rate based on many years of follow-up.

“However, posterior optic capture of the IOL without vitrectomy deserves a fresh evaluation for these young children who are old enough to be implanted with an IOL, but yet, are still young and thus prone to visual axis opacification if posterior capsulorhexis is done without capture and in the absence of a planned vitrectomy,” he said.

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This article was adapted from Dr. Wilson’s presentation at the 2018 meeting of the American Academy of Ophthalmology. He has no relevant financial interests.

TECHNIQUE

(Continued from page 26)

Dr. Arbisser is also studying a new idea of her own called hyaloid-sparing double capture (HSDC) wherein the IOL haptics are placed in the sulcus and the optic captured through both anterior and posterior capsulotomies into Bergner’s space with undisturbed hyaloid.

“HSDC may address the incidence of late bag-lens-subluxation in addition to eliminating PCO, both of which are unfortunate sequelae of today’s standard cataract surgery,” she concluded.

LISA B. ARBISSE, MD
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This article was adapted from Dr. Arbisser’s presentation at the 2018 meeting of the American Academy of Ophthalmology. Dr. Arbisser is a consultant for Myopex and is a minor stockholder in the company.
Predictable, reproducible outcomes key in cataract surgery planning

Error in first eye can guide decisions in IOL selection for fellow eye of patients

By Fred Gebhart; Reviewed by Steven Naids, MD

FOR CATARACT PATIENTS who have “normal” eyes, the error between the predicted refractive correction and the actual correction can be used to help predict error for the fellow eye, and a small study has found a good correlation between prediction error in the two eyes.

“Cataract surgery in today’s world is very much a refractive procedure,” said Steven Naids, MD, Advanced Vision Care in Los Angeles. “Achieving predictable and reproducible outcomes is very important.”

Dr. Naids and colleagues tested the hypothesis that error in the first eye can guide decisions in IOL selection for the fellow eye. They compared predictive error, the difference between the manifest spherical equivalent and the predicted spherical equivalent, across multiple formulae and discussed whether predictive error in the first eye can help determine the correction needed in the fellow eye.

R E D U C I N G E R R O R

“Intraoperative aberrometry and newer-generation IOL formulae have significantly decreased error in predictions of correction, but error still occurs,” Dr. Naids said. “It is important to use that error as information when planning fellow eye surgery.”

The retrospective study looked at 196 eyes of 98 cataract patients with average eyes and uncomplicated phacoemulsification across surgeries performed by a single surgeon. All of the eyes had average axial length, 22.5 mm to 25.0 mm. Patients with prior refractive surgery or macular pathology were excluded.

The selected IOL power was determined by ORA for all patients. The predicted spherical equivalent based on the lens power as determined by ORA was retrospectively recorded for Barrett Universal II, Hill RBF, Haigis, Olsen, and Holladay I. The cohort was subdivided into two groups: 58 patients who had a targeted refraction outside of the parameters of the original Hill RBF formula, and 40 patients evaluated with Hill RBF included. There was no significant difference in refractive error between the groups.

There were numerical differences. For a plano target, Hill RBF had the lowest mean and median absolute error in the cohort of 40 patients, 0.16, followed by ORA, 0.17, and Barrett, 0.18. In the initial cohort of 58 patients, the mean absolute error was lowest in ORA, 0.20, and Barrett, 0.26.

In the combined cohort of 98 patients, the percentage of eyes within 0.50 D of predicted was highest with Hill RBF (92.05%), followed by ORA, 91.38%. Olsen produced the lowest percentage of eyes within 0.50 D of predicted, 81.90%, with Holladay at 85.34%, and Barrett and Haigis at 87.07%.

Most of the eyes were within 0.25 D of predicted, Dr. Naids added, a clear indication that all of the current-generation formulae are effective and can be expected to produce results that are generally satisfactory to patients.

M E A S U R I N G S U C C E S S

“If you are a half-diopter off, you won’t be able to read your iPhone easily and that is not satisfactory to patients today,” he said.

It is not clear why the formulae failed by as much as a diopter in a few eyes. All of the eyes had normal axial length and keratometry. None had had any prior refractive surgery.

The study found a statistically significant correlation between the prediction error and both the first and second eyes using the current formulas as well as ORA when using a linear regression model. It is possible to anticipate the directional error in the first eye using the prediction error seen in the first eye to reduce the error in the second eye.

A study group of 20 patients outside the primary cohort found the predictive error in the first eye confirmed the IOL power for the second eye in 11 patients and changed the expected IOL power in six patients. Having the predictive error in the first eye did not help three.

The next step is a similar study in a larger cohort to evaluate the effects of different formulae and predictive error in eyes that are more reflective of the general population and eyes that may not have standard axial length.

For more information, contact Dr. Naids at steven.naids@gmail.com.

This article was adapted from Dr. Naids’ presentation at the 2018 meeting of the American Academy of Ophthalmology. Dr. Naids has no financial interests to disclose.
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The long drought in new glaucoma medications is over. After more than 20 years without a single new glaucoma eye drop, several therapeutic agents have been approved in recent months, with other novel drugs moving through clinical trials.

“There has been a lot of innovation in glaucoma surgery with MIGS, but also a lot of innovation with glaucoma medical therapy,” said Richard L. Lindstrom, MD, founder and attending surgeon, Minnesota Eye Consultants, and adjunct clinical professor emeritus of ophthalmology, University of Minnesota.

The most recent approval in March 2019 is a combination of netarsudil and latanoprost (Rocklatan) from Aerie Pharmaceuticals. Pooled data from the phase III Mercury trials showed the once-daily combination is more effective at lowering IOP than either of its ingredients used as a single agent. The combination is being pitched as a single-product alternative to multiple eye drops, which could improve adherence as well as therapeutic effect.

Aerie Pharmaceuticals had its first FDA approval in 2018 with netarsudil (Rhopressa), a Rho kinase inhibitor, or ROCK inhibitor, that works differently from other currently approved classes of glaucoma agents. Netarsudil reduces aqueous humor production, increases uveoscleral outflow and increases trabecular meshwork outflow.

Another recent introduction is latanoprostene bunod ophthalmic solution (Vyzulta, Bausch + Lomb), a prostaglandin analogue that also releases nitric oxide. The single molecule is metabolized into two active moieties, latanoprost acid and nitric oxide. The combination facilitates aqueous humor outflow through both the uveoscleral and trabecular meshwork pathways.

Nitric oxide is an endogenous signaling molecule that increases the permeability of the trabecular meshwork to enhance aqueous humor outflow. It activates the soluble guanylate cyclase-cGMP cascade to inhibit Rho kinase and lower intracellular calcium levels to mediate cell relaxation in the trabecular meshwork to improve outflow.

Also new is the first (benzalkonium chloride) BAK-free formulation of latanoprost drops. The once-daily, BAK-free formulation was developed by Sun Pharma Advanced Research Co., Sun Pharma’s R&D division. The formulation is stable at room temperature and could reduce the risk of BAK-associated ocular surface disease and will be marketed in the United States by Sun Ophthalmics.

Eye drops work well in glaucoma, but only when patients are compliant. New drug-delivery systems offer the hope of improved therapeutic outcomes by taking patient adherence out of the loop.

Punctual plugs that elute travoprost and latentoprost antigens are in development. Ocular Therapeutix has Phase I trials following preclinical data showing sustained zero-order drug release and a marked reduction in IOP. Clinical data to date show sustained IOP reduction for up to 150 days using a hydrogel formulation.

Mati Therapeutics uses a harder plug material that is easy to insert and remove. Phase II data from the Evolute plug shows sustained drug release over 12 weeks.

Allergan has two delivery devices in development, a bimatoprost eluting ring and an injectable formulation. Both are showing very good efficacy in reducing intraocular tension, and both offer the opportunity to improve outcomes in patients with adherence problems.

A variety of innovators big and small are working on everything from printing latanoprost microdots (Enovia) to new Rho kinase inhibitors or more familiar prostaglandin analogs delivered via ocular implants (Glaukos/D. Western Therapeutics Institute) and even gene therapy using adenoviral vectors to deliver therapeutic genes into retinal ganglion cells to enhance survival (Astellas/Quethera).

BioMed/Manner Research and Aerpro are both developing a Tier 2 activating molecule targeting glaucoma. BioMed is working on POAG while Aerpro is working on POAG associated with diabetes.

Neuroprotection is another active field, and Noveome Biotherapeutics is working on a human placental cell extract using intranasal delivery for neuroprotection. Disarm Therapeutics is developing a neuroprotective agent using a selective androgen receptor modulator (SARM) inhibitor.

Allergan had worked on oral memantine as a potential neuroprotective agent. Unfortunately, trials in nearly 2,300 patients comparing two doses of memantine and placebo found no effect on glaucoma visual field progression or optic nerve changes.

ONL Therapeutics has shown neuroprotection for retinal cells even after IOP elevation. At least three companies, Nenum Bioscience, InMed Pharmaceuticals, and Axim Biotechnologies, are working on a POAG agent based on cannabinoids.

“There is plenty of innovation still coming for the treatment of glaucoma,” Dr. Lindstrom concluded.

Dr. Lindstrom

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This article was adapted from Dr. Lindstrom’s presentation at the 2018 meeting of the American Academy of Ophthalmology. Dr. Lindstrom has no financial interests to report.

By Fred Gebhart; Reviewed by Richard L. Lindstrom, MD

Pharmacologic pipeline makes waves in glaucoma
Eye drops, drug-delivery system innovations aim to improve outcomes, adherence

TAKE-HOME
◗ With new agents approved and more new drugs moving through the pipeline, there is plenty of innovation occurring for the treatment of glaucoma.

DElIVERY SYSTEMS
Eye drops work well in glaucoma, but only when patients are compliant. New drug-delivery systems offer the hope of improved therapeutic outcomes by taking patient adherence out of the loop.
Imagine if your optical performed as well as your practice? Now it can. As the largest optical dispensary management consulting firm in the country, Vision Associates helps eye care practices increase their profits while decreasing their workload. You maintain ownership and control of your practice while Vision Associates puts in place a customized, turnkey program that takes care of the rest. It's your optical, only better.
Rethinking clinical strategy for treating dry eye disease
New paradigm shift is moving away from inflammation as sole core mechanism

By Cheryl Guttman Kradner; Reviewed by Debra A. Schaumberg, ScD, OD, MPH

In the 2007 Report of the International Dry Eye WorkShop (DEWS), inflammation was included in the definition of dry eye for the first time. A decade later, an updated definition from the Tear Film and Ocular Surface Society DEWS II went a step further in citing an etiological role for inflammation.

Success in the treatment of dry eye disease (DED) may require a shift away from thinking that inflammation is its sole core mechanism, said Debra A. Schaumberg, ScD, OD, MPH. Rather than focusing on anti-inflammatory medications as a strategy for managing DED, treatment methods could provide more options for managing the diverse group of people in the large dry eye patient population.

“The two drug entities approved for treating DED—cyclosporine and lifitegrast—both target T-cell mediated inflammation, and other novel anti-inflammatory agents are in development,” said Dr. Schaumberg, adjunct professor of ophthalmology and visual sciences, Moran Eye Center, University of Utah, Salt Lake City.

AS AN UNMET NEED
Inflammation may prove to be the correct therapeutic target for some people with DED and appropriate for another subgroup as a short-term intervention, Dr. Schaumberg explained.

“We have an unmet need for providing long-term management of disease for the majority of DED patients,” she said.

It is estimated that DED affects 16 million people in the United States alone, and Dr. Schaumberg pointed out that they represent a very heterogeneous population in their risk factors and presentation.

The clinical trials that led to the approval of currently available anti-inflammatory treatments for DED used very selective inclusion/exclusion criteria, and so the patients enrolled in those studies may not be representative of the broader dry eye population, she stated. “The cyclosporine and lifitegrast trials enrolled patients with a low Schirmer score, significant corneal staining, and a high level of symptoms,” Dr. Schaumberg added.

“We know there is often a lack of correlation between clinical signs and symptoms in patients with DED. The results from the trials may not be generalizable to the entire dry eye population.”

There is evidence that a majority of people with DED have meibomian gland dysfunction (MGD), either by itself or comorbid with aqueous deficiency.

“In diagnosing DED, many clinicians do not use testing that could help to identify if the condition is related to MGD or aqueous deficiency,” Dr. Schaumberg explained. “Even though the primary cause of Sjögren’s-related dry eye is lacrimal insufficiency due to autoimmune-induced lacrimal gland damage, there
A statistically significant benefit for improving corneal fluorescein staining compared with vehicle was seen as early as two weeks and was maintained at weeks 4, 8, and 12 (Figure 3).

The investigational cyclosporine product demonstrated statistical superiority to vehicle for improving symptoms.

is evidence that most of these patients also have MGD.”

Though ocular surface inflammation can be present in patients with MGD, it is not known whether the inflammation came first, causing MGD or if MGD leads to ocular surface inflammation, Dr. Schaumberg noted.

“Prescribing anti-inflammatory therapy for all DED patients may not address the underlying cause for the large percentage with MGD,” she said.

N O V E L T H E R A P E U T I C S

Novaliq is developing two topical products for commercialization in the United States, designed to address current unmet needs and based on the company’s proprietary aqueous-free semi-fluorinated alkane technology (EyeSol).

NOV03 is a preservative-free, surfactant-free product containing 100% perfluorohexyloctane that is being developed specifically as a treatment for patients with MGD-associated DED. Studies show that it acts to stabilize the tear film lipid layer and mitigate excessive evaporation.

There is evidence showing that it penetrates into the meibomian gland and liquefies the secretions, improving the quality of the meibum and of the tear film lipid layer.

NOV03 was investigated in SEECEASE, a phase II randomized, controlled, double-masked trial that included 336 patients with predominantly evaporative DED associated with MGD. The enrolled patients had a low tear breakup time, normal Schirmer score, were highly symptomatic, and had mild to moderate corneal damage.

Patients were randomly placed into one of four groups to use NOV03 two or four times daily or normal saline two or four times daily.

Topline results from SEECEASE showed the study met its prespecified primary endpoint, which was change in total corneal fluorescein staining from baseline to week 8 (Figure 1).

Compared with vehicle, both dosing regimens of NOV03 showed statistical superiority to the saline control, and the benefit of NOV03 on ocular surface damage was seen as early as two weeks after treatment initiation. The investigational agent was also associated with statistically and clinically relevant improvement in DED-related symptoms (Figure 2).

Novaliq is also developing cyclosporine A 0.1% in perfluorobutylpentane (CyclASol) as a treatment for patients who have moderate to severe DED with an inflammatory component.

“The use of perfluorobutylpentane as a vehicle for cyclosporine obviates the need for a preservative, enhances the stability and bioavailability of the active ingredient, and improves comfort,” Dr. Schaumberg said. “This product is not a generic cyclosporine, but rather an engineered formulation.”

In the phase IIb/III ESSENCE study, a multicenter, double-masked trial conducted in the United States, cyclosporine A 0.1% in perfluorobutylpentane met its primary endpoints that looked at change in total corneal fluorescein and Ocular Surface Disease Index (OSDI) from baseline to week 4. The study included 325 randomly selected patients.

Patients had a low Schirmer score, significant corneal damage with central cornea involvement, and were highly symptomatic based on their OSDI.

A statistically significant benefit for improving corneal fluorescein staining compared with vehicle was seen as early as two weeks and was maintained at weeks 4, 8, and 12 (Figure 3).

The investigational cyclosporine product demonstrated statistical superiority to vehicle for improving symptoms.
Telemedicine, teleophthalmology programs in action at Johns Hopkins
Improving technology opening new opportunities for physicians, their patients

By Steve Lenier; Reviewed by Ingrid Zimmer-Galler, MD

CREATIVE DISRUPTION of an existing model can be the path forward to a new technology, such as telehealth, a market that has grown rapidly since 2012, and is expected to continue to do so over the next several years.

WHAT IS TELEMedICINE?
The American Telemedicine Association defines telemedicine as the transfer of medical information via telecommunication (both synchronous and asynchronous) technology or specially designed medical devices for the purpose of delivering healthcare services and clinical information.

In Maryland, where Johns Hopkins University is located, telemedicine is described as the use of interactive audio, video, or other telecommunications or electronic technology by a physician in the practice of medicine outside the physical presence of the patient. Multiple layers make up a telemedicine system—tools and equipment, modes or types of telemedicine, specialty areas of care, individual patients and providers, and the locations where virtual care will be delivered.

EQUIPMENT
Both the patient and the clinician need certain tools to perform telemedicine. For the patient these can include a laptop, smartphone, or other personal smart device, equipped with a camera, and the appropriate app or software. In some cases remote monitoring equipment at home can be useful as well. The physician will need similar equipment, plus additional software and peripherals for use in diagnosing disease or progression and reporting results.

MODES
There are three main types of telemedicine, each good for certain uses. Only one of them (synchronous) requires the physician and patient to be available at the same time.

INDIVIDUAL VIRTUAL CARE
Telehealth makes individualized, patient-centric care possible for patients across the continuum of care.

LOCATIONS SERVED
At Johns Hopkins, telemedicine connects the entire healthcare system including community physician practices, all Johns Hopkins’ hospitals, affiliated hospitals, the home-care group, skilled-nursing facilities, and other collaborative facilities.

CHALLENGES
Many challenges remain in using telemedicine, most significant of which include policies and reimbursement.

While the telehealth market continues to grow, telemedicine volumes expand at the speed of reimbursement. Commercial payors have largely embraced telemedicine but government payors (Medicare and Medicaid) have been more reluctant. There has been an uptick in reimbursement for telemedicine services from government payors.

Without appropriate reimbursement, providers will not utilize new technology tools for health care delivery. Direct-to-consumer online virtual care has been more successful with self-pay options. Other notable concerns include obtaining licensing to practice medicine across state lines (a medical license is required in the state where the patient is located), and credentialing and privileging at the originating site.

TELEmedICINE AT JOHNS HOPKINS
The Johns Hopkins Medicine (JHM) Office of Telemedicine, established July 1, 2016, coordinates all telemedicine efforts across the Hopkins healthcare enterprise.

The goals of the JHM system are to:
- Create and increase access for patients
- Expand the populations served

Telediagnosis reduces costs by avoiding unnecessary patient visits and face-to-face consultations with physicians and by replacing clinic visits with less-expensive virtual care. It increases revenue by giving patients greater access to healthcare, expanding patient share capture, and by increasing a facility’s capacity to accommodate referrals and transfers for more appropriate higher-acuity patients.

Johns Hopkins Medicine has launched 44 telemedicine programs, in 31 specialties, for more than 16,700 patient encounters. Another 38 programs are being prepared to launch, with 30 more in the early pipeline stages.

DIVING DEEPER: TELEOPHTHALMOLOGY
Ingrid Zimmer-Galler, MD, associate professor of ophthalmology at the Johns Hopkins Wilmer Eye Institute, points out that teleophthalmology has the potential to be a radical transformer of care delivery.

Current teleophthalmology programs include diabetic retinopathy screening; retinopathy of prematurity (ROP) screening; glaucoma screening and disease management; age-related macular degeneration screening and management; anterior segment and ocular adnexal disease* and remote consultation and remote emergency department (ED) evaluations.

DIABETIC RETINOPATHY SCREENING
Diabetic retinopathy screening is one of the first and most beneficial uses of telemedicine in ophthalmology. In the United Kingdom, diabetic retinopathy is no longer the leading cause of vision loss in working age adults in part due

Continues on page 36: Telemedicine
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Artificial intelligence gains more acceptance in ophthalmology
Deep learning approach is driving growth of three AI models to better serve patients

By Steve Lenier; Reviewed by Dimitri Azar, MD, MBA

ARTIFICIAL INTELLIGENCE (AI) is a technology in which machines and equipment can “learn” from experience and adjust accordingly.

The technology has the potential to have a significant impact on ophthalmology in the coming years, according to Dimitri Azar, MD, MBA.

Three categories of algorithms exist for AI and machine learning:

1. **Unsupervised learning**, which groups data that has not been labeled and includes methods such as clustering.
2. **Supervised learning**, which infers a function from labeled training data and maps an input to an output based on example input-output pairs, includes linear regression analysis, support vector machine analysis, decision trees and random forests, and convoluted neural networks and deep learning, relying heavily on labeled data.
3. **Semi-supervised learning**, which uses mostly unlabeled data with a small amount of labeled data.

In ophthalmology, the neural network approach, deep learning, has surpassed other methods in recent years, said Dr. Azar, senior director of ophthalmic innovations, and clinical lead of ophthalmology, Alphabet Verily Life Sciences, and distinguished university professor and B.A. Field Chair of Ophthalmologic Research, and former dean, College of Medicine, University of Illinois, Chicago.

It requires a level of computing that was not available to most researchers in the past, so other approaches were more likely to be used. With today’s increased access to big data and analytics, there has been a plateau in the traditional methods, and deep learning has surpassed it simply because it requires more analytical abilities, Dr. Azar said.

“One thing about these learning networks that I was impressed with is that as the training commences, neural networks start off without any fine tuning, and return random results,” he said. “The neural network progressively learns the combinations and permutations of important features.”

A difference between neural networks and human beings is humans have trouble letting go of inaccurate information that was thought to be useful in the past. The convoluted neural networks, as they progressively learn combinations and permutations of the important features, learn to ignore the unimportant features in order to make better algorithms, he noted.

**NEURAL NETWORK PROCESS**

The process for networks features a weight given to particular features—the features the network finds most important are given the most weight.

As the network learns more, these weightings shift, so a feature that early on was thought to be important will be given less weight, as other features are given more weight. This allows the networks to make more accurate predictions.

**TELEMEDICINE**

(Continued from page 34)

Artificial intelligence gains more acceptance in ophthalmology
Deep learning approach is driving growth of three AI models to better serve patients

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**NEED FOR IMPROVED METHODS**

By 2030, nearly 440 million individuals worldwide will have diabetes. It is projected that by 2020 there will be a significant undersupply of ophthalmologists worldwide.

The task of detecting and evaluating diabetic retinopathy will create a resource and economic burden to healthcare systems and telemedicine screening programs will be crucial to meet the demand.

The FDA recently cleared the first artificial intelligence system for use in the United States for diabetic retinopathy screening. This is expected to enhance the efficiency of diabetic retinopathy screening as physician review of every image will no longer be necessary.

**EMERGENCY DEPARTMENT (ED)**

Urgent eye problems account for a significant percentage of ED to ED transfers from community hospitals to tertiary care hospitals due to the lack of ophthalmology coverage.

Telemedicine provides an opportunity to use an external high-resolution camera for a video visit and consultation to avoid transferring the patients from one ED to another.

It is anticipated there will be significant opportunity for growth of telemedicine in ophthalmology and those practices flexible enough to embrace it and integrate new technologies will come out ahead.

**INGRID ZIMMER-GALLER, MD**

This article was adapted from Dr. Zimmer-Galler’s presentation at the 2018 meeting of the Johns Hopkins Wilmer Eye Institute Current Concepts in Ophthalmology in Baltimore. Dr. Zimmer-Galler has no financial interests to disclose.
The algorithm-generation process begins with an input layer. Before there is any output, there are several hidden layers. While the applications operate like black boxes, the results are not always given with an explanation. This makes detection of inappropriate outcomes difficult.

As algorithms become more powerful, the methods for troubleshooting them may lag behind. This can be a potential limitation of this approach, and may have implications in obtaining approval.

**AI IN THE LITERATURE**

Dr. Azar did a literature search on the use of AI in ophthalmology, in the topics of AMD, diabetic retinopathy, retinopathy of prematurity, dry eye, keratoconus and corneal topography, glaucoma and visual fields. The search showed that from 2016 through the first half of 2018, a period of 30 months, there were about twice as many publications as in the 60 months from 2006 through 2010.

AMD and diabetic retinopathy were the most frequent topics found in the search. There are AI applications in corneal topography (some of which stem from his early work with Dr. Paul Lu), and dry eye as well. He proposes future studies using AI that could simplify the diagnosis and classification of different types of dry eye, and their severity, potentially replacing the current methods that are based on the DEWS II report.

In glaucoma there are studies utilizing deep learning. Some look at the nerve fiber layer, and others focus on the optic nerve. Future studies will include using OCTA to examine blood flow in the retina, adjacent to the nerve.

**CONNECTING THE DATA**

When it comes to AI, a major problem in glaucoma is that the data comes from multiple sources, which frequently do not connect with each other. There may be billing data, patient information, imaging data, etc., all coming from different sources. While it would seem easy to connect these sources, doing so in a HIPAA-compliant way is not always easy.

A group at the University of Illinois has developed a machine learning method to collect the data that comes from various diagnostic tools and records, under one name or one eye, staying within HIPAA regulations.

Currently, most physicians look at data from multiple sources to make a diagnosis. The time-consuming visual field test is probably the most reliable way of detecting whether or not someone is progressing.

By linking data together, with AI applications it should become easier to find shortcuts that can predict what will happen in glaucoma, like current trends in diabetic retinopathy, he said.

**FUNDUS PHOTOGRAPHY**

Fundus photography is a big area of AI applications in ophthalmology. The Google group has published articles on the use of AI in several areas, including refractive error prediction, cardiovascular risk detection, identification of retinal lesions, and diabetic retinopathy.

An article published in IOVS in 2018, using data from the UK biobank and the AREDS study, looked at attention maps that predicted refractive error, and the refractive error prediction was good. One of the figures in the article shows attention maps for myopic, emmetropic (neutral), or hyperopic patients.

Even with the computer pointing out the areas it used to make a diagnosis, it can still be difficult for an ophthalmologist to make a diagnosis. The computer is able to do so.

In a landmark article published in *Nature Medicine* in 2017 the researchers used deep learning architecture to make referral recommendations in a group of OCT scans, done with multiple devices.

By using tissue segmentation they were able to give a probability of a diagnosis, and accordingly make an urgent, semi-urgent, routine, or observation only referral suggestion.

If “trained” properly, the machine was able to have an error rate in the patient referral decisions of only 5.5%. This was better than 80% of the retina specialists and all of the optometrists, who were given only the OCT data, but also fundus data and notes.

Dr. Azar also discussed the article he called “transformational.” It was published in JAMA 2016 and focused on using deep learning for diagnosing DR. The study results showed very high sensitivity and specificity, and indicated that diagnoses were as good or better than those of the retina specialists who were convened there.

An area receiving the most attention in retinal AI applications is OCT. One study looked at the severity, characterization and estimation of 5-year risk of AMD progression using AI and found that the machine did very well.

Another group studied the prediction of individual disease conversion in early AMD. The authors found the most critical quantitative features for progression were retinal thickness, hyper-reflective foci, and drusen areas. Dr. Azar said, “The interesting part here is this is not only predicting a disease, but also includes discovery.”

**CONCLUSIONS**

There are great applications of AI in ophthalmology, and the uses will continue to expand. But there are several limitations, including:

- The quality and diversity of training sets
- Problems with image quality
- Because the statistics are very good, people may erroneously conclude that the system is not making errors
- The black box effect of convoluted neural networks

**MEDICAL EDUCATION**

More than 100 years ago, the famous Flexner report established the biomedical model of education, training, and research as an enduring basis of medical education.

Dr. Azar described this as a cross-disciplinary convergence in ophthalmology, but said there are caveats when it comes to the education of ophthalmology fellows, residents, and students. There needs to be an understanding that the knowledge base these machines can provide should only be a foundation to facilitate interpretation of data.

He emphasized the importance of the humanistic elements of medicine—professionalism, communication, empathy, compassion, and respect.

Dr. Azar said these important topics should now be included in the curriculum of all medical students, because much of the information doctors previously needed to learn will be easily obtained through AI.

**TAKE-HOME**

- Artificial intelligence can provide a knowledge base that can be a foundation for the interpretation of data. The importance of the humanistic elements of medicine remain vital.
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Ophthalmology Times
Four simple rules to ensure more ‘good days’ at work

Supportive leadership structure creates a culture that benefits entire team

By Donna A. Suter

want better days! This line from an episode of “The Good Doctor” holds the key to your success as a practice owner.

I suggest the following thoughts might also be as true for you as they were for the characters in a recent episode titled “Aftermath.”

- You want to be respected as a doctor and your day shines a little less bright when someone second-guesses your decisions.
- You aren’t really “friends” with all of your colleagues, but it would be nice to “do lunch” together.
- You feel like you don’t really have any close friends.
- You feel you have to put work and patient care in front of personal relationships.

If the series writers can resolve these heavy emotions in 50 minutes, this writer can offer corresponding rules and guidance in 1,200 words or less.

RULE #1 IF IT WASN’T DOCUMENTED, IT WASN’T PERFORMED!

Be careful of “cloning” previous visits, “pulling forward,” or defaulting all fields to “normal” when charting patient care.

Proper charting documentation is crucial. There is a difference between wellness coverage versus medical visits, and the way these are charted may be reviewed, as OIG has identified this as a target area for audits.

The move toward expanded “wellness” coverage that began several years ago has become a sweeping trend. It’s a great trend and prevents preventable blindness.

There is a tremendous power in knowing you control your attitude. It rings a balance because of your internal positivity.

The challenge is for those of you who are seeing wellness visits from those who are diabetic or glaucoma candidates, which can morph into more than a wellness check.

The challenge is for those of you who are seeing wellness visits from those who are diabetic or glaucoma candidates, which can morph into more than a wellness check.

Establish triage guidelines and how to communicate your intentions to either diabetic or glaucoma candidates using wellness eye benefits or diabetic or glaucoma patients returning for medical exams as part of their follow-up care. Asking for co-payments and deductibles should not be a big emotional hurdle for employees. Being properly paid for your complex problem-solving abilities and medical acumen is paramount to practice success.

RULE #2 LUNCH WITH THE BOSS IS NEVER JUST “LUNCH”

There is a lot that goes into running a practice, a great deal of which is the help you get from others. While leadership as a discipline is important, the personal and interpersonal sides of leadership are every bit as important as the great leadership themes of vision and/or execution, strategy, and the like.

No matter how great a vision or strategy, the doctor must get it all done with and through people.

And that is where lunch comes in. I want you to be friends with employees without employees taking advantage of you. Build a culture that allows employees to feel appreciated—it has more to do with success than your business acumen.

RULE #3 BOUNDARIES ARE FOR LEADERS

I’m not sure your bestie should be someone who works for you. Henry Cloud, PhD, writes in his self-help books about boundaries. According to Dr. Cloud, a boundary is a structure that determines what will exist and what will not—so keep this thought in mind.

RULE #4 YOU ALWAYS GET WHAT YOU CREATE AND WHAT YOU ALLOW

This is a quote Dr. Cloud uses a lot, but I heard it first from another and somewhat lesser-known psychologist, Nancy Martin, PhD. Dr. Martin showed me that how I carried myself taught others how to treat me in about 15 minutes. This great woman helped me learn to coach without being bossy and share criticism without shattering egos.

Part of gaining all this communications expertise is learning how to say you are sorry and forgive yourself.

Another friend who helped me is Beverly Inman-Ebel, MA, CCC-SLP. She wrote a book that I can quote from memory, “Talk is Not Cheap, Saving the High Cost of Misunderstanding at Work and Home.” Beverly’s book proves that it is possible never to upset anyone by miscommunicating.

When you make a financial investment in stocks or mutual funds, you can see the return. If you invest well, the return on being a better communicator is positive. When the investment climate is bullish or soft, knowing you are investing wisely means a greater peace within because of your internal positive attitude.

There is a tremendous power in knowing you control your attitude. It rings a balance that creates a harmony which allows you to handle the practices ups and downs.

Having a supportive friend not in the practice is a valuable connection. Later, you will be the one radiating success. A rewarding, pleasurable career grows from meaningful achievements. Small steps achieved through becoming a leader creates a culture that supports your team. When people exclaim that they just don’t know how you do it all, tell them it all started with wanting to have more “good days.”

DONNA A. SUTER
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‘Spark joy’ in the dispensary with these frame board tips

Follow Marie Kondo’s lead, spring-clean your optical shop to make way for fresh frames

By Donna A. Suter

HAVE YOU FOUND YOURSELF looking at your wardrobe and asking what pieces bring you joy? A new friend once offered me advice on how to dress. “If you would dress as I see you, you would be beautiful.”

I thought that an odd statement and never pressed for details. How would I know what clothes others would like to see me buy? It seems that dressing to please others may be a little emotionally unhealthy.

Twelve years later, I realize this individual was offering the same nugget of wisdom that organizing consultant Marie Kondo now shares—an invitation to find what “sparks joy” in my closet.

GET IN THE GAME

Do you see the application in your optical practice? Is it time to trim down the total number of frames in inventory to a more manageable number? Frame inventory is defined as the total number of eyeglass frames on display and in storage.

I recommend you decide on how many frames to keep on hand by looking at your historic turnover rate. Frame inventory turnover is defined as the number of pairs of complete spectacle prescriptions (frames and lenses, excluding reuse of existing frames) dispensed in 12 months, divided by the total number of frames in inventory.

If you are just getting into the optical game, your turnover might be just once a year. If that’s you, really take a hard look at those frames. If the total number you own is more than 500, consider cutting the number down to 500 until your turn rate improves.

If you are grossing $500,000 in optical sales, your annual turnover should be two to three times a year. I have clients who turn inventory six times in a year. Four or five turns per year are optimal for most optical departments.

Three turns per year is the minimum with which I suggest you will be happy.

One reason for poor performance may be that your frames aren’t sparking joy in consumers. Wanting your patients to see the beauty completely applies to successful frame board management. Marie Kondo-ing your frame boards to spark joy isn’t as odd as it sounds.

The challenge opticians face is that probably 20% of frame inventory sells very well. It’s the other 80% of that number that tends to cause heartburn.

Please, please do not throw all your frames on the floor and wait for joy. Keep the basics and those required by the vision-plan programs. Don’t replace or trade out inventory just because you are bored with what you have to carry.

There are two ways to evaluate frames. Selling a device needed to put spectacle lenses into and selling something that the patient feels excited about wearing.

“Basics” are frames that people come in and buy.

“Bless their hearts,” as we say here in the South. They have not heard of Marie or understand they should only wear what sparks joy. They just want what their plan provides or a repeat of what they have been wearing since they were 20.

Basics are also frames that are sure sellers. Some eyewear aficionados might refer to these frames as your “bread and butter” lines. These are styles that always sell. Styles like aviators or heavy, geeky, plastic frames.

Bread and butter also refers to frames that fit a certain size face.

Narrow-width women’s frames that fit a petite granny’s narrow face as well as frames that add structure to a full, round face should always be on your frame board.

TAKE-HOME

➢ In your dispensary, follow three rules when it comes to frame board management: optimize inventory turnover, stick with ‘bestseller’ classics, and be open to current frame trends.

ALLOCATE 20% TO POSSIBILITY THINKING

Within your budget, purchase 20% of the number for possibility thinking. Frames you think would add beauty to your patients’ faces. Frames that are different and not what the patient can find on a virtual frame-buying site.

To make room on your boards, and to have enough money to invest in fresh merchandise, may mean “breaking up” with an existing vendor and forming a new liaison. Before doing this, ask your frame representatives if they sell a product line that you don’t carry. Telling them what you don’t want more of might lead to a productive conversation about viable options.

Evaluate your current frames to determine which vendors have the product you need to achieve your goals. When deciding between two sources, pick the one that will help train your staff. They must know how to talk about the frames that you want your customers to buy.

When you get your new frames home, follow sound merchandising guidelines. Group frames by material, followed by eye shape, then by vendor, designer, and vendor. Eye level is “buy” level.

CUSTOMER TRENDS

Freshening the frame board means buying frames that are so appealing to consumers that they want to max out their emergency credit card just so they can wear them.

Typically, a seasoned frame inventory manager buys frames that fall into categories. Categories might be gender, age, venue, or retail price points. Examples of price point categories are budget, core, designer, and luxury.

Cultivating empathy for your target market’s buying patterns means higher profitability and lower material expenses in the optical department—frames that sell won’t be around to return or to mark down.

DONNA A. SUTER

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When your dreams are trying to tell you something

A ‘groovy’ doctor honor PAGE 10
Corneal endothelium characteristics vary PAGE 20

Pharma offers advances in glaucoma PAGE 30
4 rules to ensure ‘good days’ PAGE 40

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