Vol 8, No. 1

Cornea Society News

A Cornea Society Publication

January 2012

Cornea Society/EBAA Fall Educational Symposium lives up to name

Andrea Ang, MD, accepts the Best Paper Award from David Glasser, MD, Marian Macsai, MD, and Monty Montoya

The 2011 Cornea Society/EBAA Fall Educational Symposium, moderated by **Sadeer B. Hannush, MD**, and **Stephen C. Kaufman, MD**, offered a full day's worth of science on advances in endothelial, lamellar, and penetrating keratoplasty procedures; keratoprostheses; and more.

The opening paper of the session set the tone for the high caliber scientific discussions that would follow. **Mark A. Terry, MD**, found the amount of time donor tissue is stored before use impacts neither the cell count nor complication rates, and commented the "upper limit of how long we can wait before using the tissue is unknown."

Those results may have an impact outside the U.S. as well, where donor grafts may be 4-5 days old before use, he added. Although time-to-use was not measured in a different retrospective study in India on pediatric DSEK graft survival, at the end of 1 year 86% of pediatric grafts survived, according to **Jatin Ashar, MD**.

Moving to surgical techniques, **Massimo Busin, MD**, said ultra-thin Descemet's stripping automated endothelial keratoplasty (UT-DSAEK) may be the "ideal graft for EK procedures," as it offers the rapid visual recovery of DMEK but is easier to perform. In 152 surgeries with 1-, 3-, 6-, and 12-month follow-up, BCVA of 20/20 was achieved in 41%; 82% were 20/25 or better at 6 months, he said. "The fastest and best recoveries were in phakic patients," he said. His two-step procedure involves one pass with a 300-micron head and the second with a 50-micron head.

As a proponent of DMEK, **Francis W. Price Jr., MD**, spoke about using a roughened bimanual aspiration handpiece to "polish" the peripheral recipient bed to reduce the rate of air reinjection after DMEK.

"Without polishing, air reinjection was necessary in 46 of 100 eyes," he said. "With polishing, the air reinjection rate was significantly lower at eight of 32 eyes (25%)." In phakic patients he recommended injecting earlier than in pseudophakes.

DMEK/DMAEK procedures will continue to gain converts because of their potentially better visual outcomes, said **Winston Chamberlain, MD**. However, using a femtosecond laser to prepare donor corneas (fDMAEK) yielded greater endothelial cell loss than manual DMEK preparation or DSAEK procedures. Conversely, femtosecond lasers may aid in more predictable big bubble formation in DMAEK.

Prosthetic lenses show promise

In patients with severe ocular surface disease, a prosthetic rehabilitation of the ocular surface ecosystem (PROSE) offers "improved visual acuity and visual function," said **Kristen Hawthorne, MD**. At 6 months, patients with neurotrophic keratitis, exposure, Stevens-Johnson syndrome, and graft-vs.-host disease were likely to still be wearing the device. A lower success rate was seen in patients with a self-reported diagnosis of anxiety, depression, or fatigue. The scleral lens she described has a Dk of about 88, "which is around what typical gas permeable contact lenses are," she said. "It's not the piece of plastic that matters, it's the fit."

Two other presentations on the Boston Type 1 KPro found it to be a viable option outside the U.S. to manage repeat graft failure and chemical injuries. Gamma irradiated, femtosecond pre-cut corneal lenticules without viable endothelium may be a good alternative to fresh corneal tissue in KPro procedures.

CDS projections

A greater restriction on donor age and endothelial cell density would decrease availability and increase cost, said Kevin Ross, MPH. A 2-year retrospective analysis of 10,310 donor corneas (from 9,365 donors) evaluated the impact of endothelial cell density and donor age

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The Cornea Society

January 2012

President's Message

Dear Colleagues,

This New Year, I am honored to receive the torch of the presidency of The Cornea Society from David Glasser, whose leadership undoubtedly leaves big shoes to fill. During his term, David has worked tirelessly to lead The Society to new heights, and it has been a great privilege for all of us on the Board who have benefited from his insightful guidance and experience. David will of course be our immediate past president, and it will be reassuring to have him continue to guide the Board and The Society.

The transition of the presidency sets a new milestone for The Society as we endeavor to serve the global community of corneal surgeons around the world, and one of my goals will be to help The Cornea Society, with its current linkages to the Asia Cornea Society and EuCornea, become more international. In my role as president of the Asia Cornea Society, I envisage even stronger relationships between the societies, especially as our Board continues to have strong international representation from the Americas, Europe, and Asia. One idea we are exploring is to create a global list of corneal fellowship and training programs, which would be on our website, so that young members and ophthalmologists wishing to pursue our specialty would have access to the wealth of training initiatives currently around the world. Recognition must also be given to Michael Belin's outstanding efforts in pursuing international relations, evident in the burgeoning calendar of The Cornea Society's participation in various international and regional ophthalmic meetings in the coming year. We would also like to welcome our newly elected Board members, Anthony Aldave, Natalie Ashfari, Kathy Colby, and Sonia Yoo, who will bring fresh ideas and initiatives.

Led by our new Scientific Program Chair, Barry Lee, you can count on the scientific programs at ASCRS Cornea Day 2012 and AAO Cornea Subspecialty Day 2012 to be even more stimulating. They will continue to provide scientific content to meet the educational needs of the comprehensive as well as the corneal fraternity. In addition, with our new VP of International Relations, Terry Kim, we hope to further engage industry partners to continue their strong support of The Society.

Our members continue to be the heartbeat of The Society and the nuclei of our endeavors. In order to have our fingers on the pulse of our members, Gail Reggio, our executive director, initiated two focus group meetings during the ASCRS Symposium & Congress in San Diego in March 2011, to obtain feedback on The Society's programs and services. Five task forces have since been created to address the objectives identified from the focus group meetings, namely a Membership Task Force chaired by Michael Belin; a Vision Mission Branding Task Force chaired by Marian Macsai; a Meetings/Education Task Force chaired by Chris Rapuano; a Young Physicians Task Force chaired by Barry Lee; and a Communication Task Force chaired by Penny Asbell. These various task forces have since been hard at work and made significant recommendations that I am convinced will result in a new vibrancy and enable The Society to be even more responsive to the immediate needs of our members.

This year also marks the transition for the editorship of our *Cornea* journal, as Doyle Stulting, who has tirelessly guided the journal to unprecedented growth for 9 years, passes on the baton to Alan Sugar, our incoming editor, whose distinguished career and vast experience will unquestionably bring the journal to the next level. Our sincere thanks must also go to Ed Holland and Sadeer Hannush for their great contributions over the last few years and especially to Mark Mannis, our immediate past president, as they rotate off the Board.

Finally, I would like to express my appreciation to The Cornea Society Board of Directors for their patience and support. It is indeed gratifying to see The Cornea Society prosper and grow from strength to strength, and 2012 will undoubtedly bring new challenges and successes as we continue to strive toward our mission to promote education and research in the corneal field around the world.

Sincerely,
Donald T.H. Tan, FRCS
President

Looking at the latest in cornea

Keratoprostheses, keratitis, and keratoplasties just some of the highlights covered at AAO's Cornea Subspecialty Day

The American Academy of Ophthalmology's 2011 Cornea Subspecialty Day, sponsored by The Cornea Society, featured a variety of cutting-edge cornea-focused presentations.

Presenters covered a host of topics, including ocular surface disease, infectious keratitis, and corneal transplantation, including lamellar keratoplasty, penetrating keratoplasty (PK), and pediatric keratoplasty.

One highlight was "A Biosynthetic Alternative to Human Donor Tissue," presented by **Per Fagerholm, MD**, professor of ophthalmology, Linkoping University, Linkoping, Sweden. Dr. Fagerholm presented on the results of a phase I study in 10 humans using material made from human recombinant collagen type III that is crosslinked using water-soluble carbodiimide. This biosynthetic alternative is used to mimic the corneal stroma's extracellular matrix.

The 10 patients, all of whom had anterior lamellar keratoplasty performed, were compared against a control group that underwent PK with human donor corneas.

At 3 years post-op, patients with the biosynthetic material had peripheral host-implant interface haze and focal areas of haze in the midperipheral central cornea, the latter of which may have been due to disruption of re-epithelialization. Although Dr. Fagerholm said the best corrected visual acuity was not impressive (although it improved with contact lens insertion), the overall trial results were solid.

"The phase I trial demonstrated safety and long-term stability," he said.

The next steps are to improve the material and surgical technique even further and expand the study, Dr. Fagerholm said.

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Richard Troutman, MD, and David Glasser, MD, present the Troutman Award to Daniel Bohringer, MD

restrictions, presuming a $2,000 processing fee was in place.

"According to the Cornea Donor Study guidelines, 100% of the tissue would be available with a 70-year-old donor that had 2,000 cells," he said. But if surgeons demanded 2,300 cells, only 87.5% of the available tissue in 70-year-olds would be viable (at a cost of $2,285); at 2,800 cells only 36.9% of the donor tissue would be available from 70-year-olds, and the "break even" point would be $5,427, Mr. Ross said. The costs continue to escalate if donor age is dropped to 65 or 60 years old and cell counts increase, he said.

Awards

Throughout the day, several awards were presented. **S. Arthur Boruchoff, MD**, was this year's recipient of the **Claes H. Dohlman, MD, PhD**, Award, given to an individual who has fostered teaching corneal fellows. Dr. Dohlman, who accepted on Dr. Boruchoff's behalf, said Dr. Boruchoff has been "tremendous and selfless" with his time over the course of his career. Friends for the past 50 years, Dr. Dohlman said it was he who should be honored that "such a stellar educator" was named this year's recipient. "Art is a great teacher—better than anyone else," he said.

The best paper to be published in *Cornea* by an author under the age of 40 is awarded the Troutman Prize Lecture. This year's recipient, **Daniel Bohringer, MD**, and colleagues wrote about long-term graft survival in penetrating keratoplasty. They found the incidence of late endothelial failure was 8% in patients with keratoconus and 33% in those with bullous keratopathy.

Richard Troutman, MD, who established the award in 2008, was on hand to deliver the award personally.

"Nothing in this world happens alone," he said. "We are all in this together."

The EBAA's highest honor, the R. Townley Paton Award Lecture, was bestowed upon **Alan Sugar, MD**, the incoming editor of *Cornea*. He spoke about the 5-year results from the Cornea Donor Study, finding endothelial cell density "was not predictive of early graft failure. But at 6 months, recipients with less than 1,700 had a much higher rejection rate—13%—when compared to those with cell counts between 1,700 and 2,499 (3%) and those with more than 2,500 (2%). So it's what happens initially that is a predictive factor."

Lastly, the Best Paper Award was given to **Andrea Ang, MD**, who discussed the incidence, characteristics, and outcomes in ocular surface transplantation. "Younger patients should be treated more aggressively to prevent rejection," she said. "Close monitoring, early recognition, and aggressive treatment—even when it's a low-grade rejection—is crucial."

Looking continued from page 3

Keratoprostheses

Other presentations focused on keratoprostheses such as the Boston KPro (recently renamed the prosthetic replacement of the ocular surface ecosystem, or PROSE). Although U.S.-based clinicians think of the Boston device when they hear the word KPro, there are other KPros to consider worldwide, such as the osteo-odonto-keratoprosthesis, said Christopher Liu, FRCOphth, Sussex Eye Hospital, Brighton, U.K. The device uses a patient's tooth root and alveolar bone to support an optical cylinder, said Dr. Liu. The device was developed about 40 years ago but is only now gaining more attention. Sixty cases with the OOKP have been completed in Brighton since 1996, Dr. Liu said. The OOKP is not as easily reversible as the PROSE device, but it has strong results, he said.

Keratitis

Another hot topic in cornea is the use of steroids to treat bacterial keratitis. **Thomas M. Lietman, MD**, University of California, San Francisco, reported on the results of a clinical trial published online in October on the *Archives of Ophthalmology* website. The study's primary outcome was best spectacle corrected visual acuity (BSCVA) at 3 months. Five hundred patients were ultimately enrolled. The study compared the use of prednisolone sodium phosphate 1.0% to placebo as adjunctive therapy for bacterial corneal ulcers. "Eligible patients had a culture-positive bacterial corneal ulcer and received topical moxifloxacin for at least 48 hours before randomization," according to the study abstract. Investigators found that adding a steroid did not improve BSCVA at the 3-month mark, Dr. Lietman said.

Keratoplasty

As more surgeons decide to perform Descemet's stripping endothelial keratoplasty, they should consider some helpful pearls, said **Friedrich E. Kruse, MD**, professor of ophthalmology, University of Erlangen, Germany. Surgeons should carefully select patients and donors, select the type of insertion technique they will use, and consider converting to Descemet's membrane endothelial keratoplasty (DMEK) or ultrathin Descemet's stripping automated endothelial keratoplasty. If performing DMEK, surgeons should control graft orientation, graft insertion, and donor unfolding and attachment, Dr. Kruse said.

Corneal neovascularization

Corneal neovascularization is often associated with corneal scarring, the second most frequent cause of blindness globally, said **Reza Dana, MD**, professor and director of Cornea & Refractive Surgery, Massachusetts Eye and Ear Infirmary; Department of Ophthalmology, Harvard Medical School; and senior scientist and W. Clement Stone Scholar, Schepens Eye Research Institute, Boston. For this reason—and because corneal neovascularization can amplify other corneal pathologies—it is important to understand causes and therapies for it, Dr. Dana told attendees.

Common causes of corneal neovascularization include infections, chemical burns, penetrating trauma, degenerations, autoimmune disorders, meibomian gland dysfunction, and corneal transplants, Dr. Dana said.

"Management approaches should optimize the treatment of underlying etiology or the offending agent," Dr. Dana said. Depending on the cause, this may include pterygium surgery, amniotic membrane grafting, limbal stem cell grafting, laser treatment, photodynamic therapy, diathermy, or—the most common treatment approach—pharmacologic measures. Dr. Dana and fellow investigators have been looking at local ocular delivery using the anti-vascular endothelial growth factors bevacizumab (Avastin, Genentech, South San Francisco) and ranibizumab (Lucentis, Genentech) to treat corneal neovascularization.

Future therapies

Toward the end of Cornea Subspecialty Day, **Shigeru Kinoshita, MD**, professor of ophthalmology, Kyoto Prefectural University of Medicine, Kyoto, Japan, focused on three types of therapies in development to treat corneal endothelial disease. They are cultivated corneal endothelial cell sheet transplantation, cultivated corneal endothelial cell injection therapy, and eye drops. Dr. Kinoshita and fellow investigators have used cell sheet transplantations in primates with advanced corneal endothelial dysfunction; the transplantations were moderately successful. Cell injection therapy along with a Rho-kinase (ROCK) inhibitor in a group of rabbits and monkeys led to better endothelial cell adhesion, high cell density, and normal-looking morphology. The use of eye drops, which Dr. Kinoshita described as still "a dream," involves the use of ROCK inhibitor eye drops. Experimental use of drops in rabbits and monkeys led to the regeneration of a corneal endothelial monolayer and high endothelial cell density.

Editors' note: Dr. Dana has financial interests with Alcon (Fort Worth, Texas), Allergan (Irvine, Calif.), Bausch + Lomb (Rochester, N.Y.), and other ophthalmic companies. Dr. Kinoshita has financial interests with Abbott Medical Optics (AMO, Santa Ana, Calif.), Alcon, Hoya (Chino Hills, Calif.), and other ophthalmic companies. Dr. Kruse has financial interests with CellSeed (Tokyo) and Santen (Emeryville, Calif.). Drs. Fagerholm, Lietman, and Liu have no financial interests to report.

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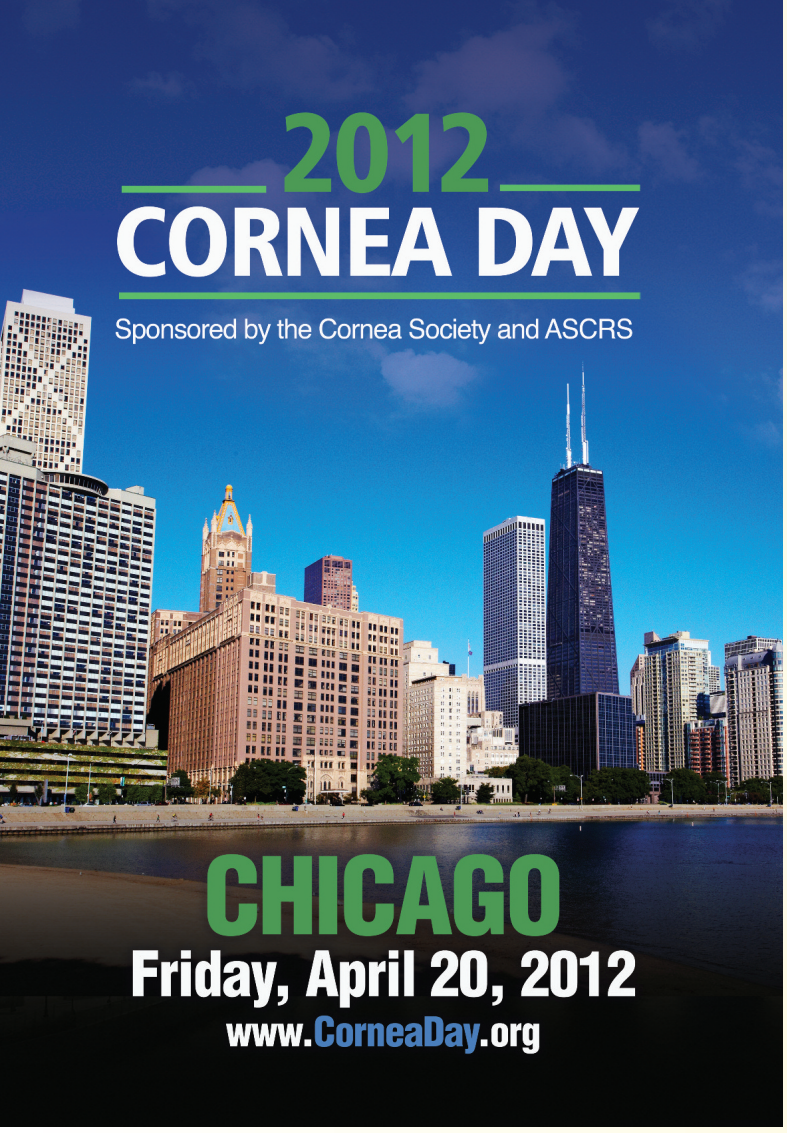

2012 Cornea Day is geared toward practicing ophthalmologists with an interest in comprehensive ophthalmology, anterior segment surgery, and corneal disease.

McCormick Place

Friday, April 20, 2012

8:00AM – 4:30PM

For registration, housing, and program updates go to ...
www.CorneaDay.org

Terry Kim, MD ***Co-chair***
ASCRS Cornea Clinical Committee

Donald TH Tan, FRCS ***Co-chair***
Cornea Society

Anthony J. Aldave, MD
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W. Barry Lee, MD
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Marian S. Macsai, MD
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Francis S. Mah, MD
ASCRS Cornea Clinical Committee

Neda Shamie, MD
ASCRS Cornea Clinical Committee

David T. Vroman, MD
ASCRS Cornea Clinical Committee

Program Outline *(subject to change)*

8:05 AM – 9:40 AM
Corneal Challenges for the Cataract Surgeon

Moderators
David T. Vroman, MD, &
Anthony J. Aldave, MD

Faculty
Ike K. Ahmed, MD, FRCSC
Graham D. Barrett, FRACO
Samar K. Basak, MD, FRCS
Robert J. Cionni, MD
David R. Hardten, MD
Warren E. Hill, MD
Samuel Masket, MD
Mike E. Snyder, MD
Alejandro Navas, MD

9:40 AM – 9:55 AM ***Break***

9:55 AM – 11:35 AM
Controversies in Corneal and Ocular Surface Transplantation

Moderators
Terry Kim, MD, &
Neda Shamie, MD

Faculty
Anthony J. Aldave, MD
Winston D. Chamberlain, MD, PhD
Luigi Fontana, MD, PhD
Edward J. Holland, MD
John A. Hovanesian, MD
Francis W. Price Jr., MD
Christopher J. Rapuano, MD
Allan R. Slomovic, MD
Mark A. Terry, MD

11:35 AM – 1:00 PM ***Lunch***

1:00 PM – 2:35 PM
Advances in Diagnostics, Therapeutics, and Corneal Imaging

Moderators
W. Barry Lee, MD, &
Francis S. Mah, MD

Faculty
Renato Ambrósio Jr., MD
Richard E. Braunstein, MD
Reza Dana, MD
Richard S. Davidson, MD
Sheraz Daya, MD
David A. Goldman, MD
Jack T. Holladay, MD
Stephen C. Kaufman, MD, PhD
Jonathan H. Lass, MD
Victor L. Perez, MD
J. Bradley Randleman, MD
Christopher E. Starr, MD
Elmer Y. Tu, MD

2:35 PM – 2:50 PM ***Break***

2:50 PM – 4:30 PM
Innovations and Dilemmas in Refractive Surgery

Moderators
Marian S. Macsai, MD, &
Donald TH Tan, FRCS

Faculty
Dimitri Azar, MD
Perry S. Binder, MS, MD
Deepinder K. Dhaliwal, MD
William J. Dupps Jr., MD, PhD
José L. Güell, MD, PhD
D. Rex Hamilton, MD
Ronald R. Krueger, MD, MSE
Richard L. Lindstrom, MD
John Marshall, PhD
Jodhbir S. Mehta, MD
Shazad Mian, MD
Kerry D. Solomon, MD
John Vukich, MD
Sonia H. Yoo, MD

Pinpointing causes and treatment of corneal stem cell deficiency

Corneal stem cell deficiency requires some unique diagnostic techniques and management, and presenters at the AAO symposium "Unrecognized Stem Cell Deficiency: What Every Ophthalmologist Needs to Know" covered a range of related information. The symposium was sponsored by The Cornea Society.

Causes

Various causes of corneal stem cell deficiency range from infection to congenital causes to trauma, said **Ivan R. Schwab, MD**, professor and director, Cornea & External Disease Service, University of California Davis, Sacramento, Calif.

Regarding infection and corneal stem cell deficiency, "the trachoma agent is the most common worldwide," Dr. Schwab said.

Other causes include herpes simplex virus, neurotrophic ulcers, viral agents, contact lens solutions and related preservatives, glaucoma medications, radiation, mitomycin C, graft-vs.-host disease, and acquired/autoimmune diseases, Dr. Schwab said.

Globally, the most common cause is infection. Dr. Schwab also noted that corneal stem cell deficiency from autoimmune disease and congenital causes are the most difficult to treat.

Diagnosis

Corneal limbal stem cell deficiency is more common than previously thought, but it is also easy to confuse with other conditions, said **Mark Mannis, MD**, professor and chair, Department of Ophthalmology & Vision Science, University of California Davis Eye Center, Sacramento, Calif.

Conditions that might appear similar to corneal stem cell deficiency include punctate epitheliopathy, macro-epithelial defects, herpes simplex and herpes zoster, *Acanthamoeba* keratitis, corneal vascularization, acne rosacea, and fibroses such as pterygium and Salzmann's degeneration, Dr. Mannis said.

Clinicians can pinpoint if a patient actually has corneal stem cell deficiency by considering the condition's historical setting, whether it's unilateral or bilateral, focal or diffuse, and whether it's accompanied by significant inflammation or associated lid or skin disease, he said.

Corneal stem cell disease is best diagnosed based on clinical features and the detection of cellular or molecular markers, said **Stephen C. Pflugfelder, MD**, professor of ophthalmology, Baylor College of Medicine, Houston. "Cellular and molecular biomarkers may be good but require more clinical trials," Dr. Pflugfelder said. Cytologic biomarkers may also be used in the future for diagnosis, he said.

Treating corneal stem cell deficiency

"Supportive therapy [for corneal stem cell deficiency] can improve vision and reduce symptoms," said **Deborah S. Jacobs, MD**, medical director, Boston Foundation for Sight. Dr. Jacobs called serum and plasma for the condition a kind of "Miracle-Gro." However, the logistics of procuring the compound and the risk of contamination make them challenging treatment options.

Topical vitamin A is another treatment option not commonly available in the United States and one that must also be compounded, she said.

Amniotic membrane should be used only if the patient experiences acute setbacks. "It doesn't change the course of disease," she said.

The use of a contact lens or therapeutic lens is an option as long as daily disposables are avoided if the patient might wear them overnight, Dr. Jacobs said.

Friedrich E. Kruse, MD, professor of ophthalmology, University of Erlangen, Germany, spoke about autologous and allogenic stem cell transplantation as a management option. However, he also noted that incomplete stem cell disease should not be subject to transplant options.

Other presentations during the session included "Aniridic Keratopathy: Diagnosis and Management" from **Jose Gomes, MD**, Sao Paolo, Brazil; "Corneal Stem Cell Transplantation: Immunosuppression" from **Ali R. Djalilian, MD**, assistant professor, Cornea Service, University of Illinois at Chicago; "Other Stem Cell Sources; Mucosal, Ex Vivo Expansion, Etc.," from **Kohji Nishida, MD**, professor of ophthalmology, Kyoto Prefectural University of Medicine, Kyoto, Japan; and "Permanent Keratoprosthesis Surgery for Corneal Stem Cell Deficiency," from **James Chodosh, MD**, professor of ophthalmology, Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston.

Castroviejo Lecture

Also at the stem cell deficiency session, this year's Cornea Society Castroviejo

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Lecturer **Joel Sugar, MD**, professor, Cornea Service, University of Illinois at Chicago, addressed the high frequency of keratoconus, which occurs at a rate of 1 in 2,000 in the general population. Still, "its cause remains elusive," Dr. Sugar said.

Various biochemical changes associated with keratoconus could be genetic or environmental in origin, he said. Eye rubbing also has a long history of association with keratoconus, Dr. Sugar said, noting that eye rubbing could lead to K1 mediated apoptosis. Environmental factors associated with keratoconus include floppy eyelid syndrome, sleep apnea, contact lens wear, ultraviolet light exposure, altitude pressure, hormonal factors, and refractive surgery. However, when patients have both diabetes mellitus and keratoconus, the latter seems to be less severe. "This is a complex disease," he said.

Editors' note: Dr. Jacobs has financial interests with the Boston Foundation for Sight. Dr. Kruse has financial interests with CellSeed (Tokyo) and Santen (Emeryville, Calif.). Dr. Pflugfelder has financial interests with Allergan (Irvine, Calif.), Bausch + Lomb (Rochester, N.Y.), and Inspire Pharmaceuticals (Raleigh, N.C.). Drs. Mannis, Schwab, and Sugar did not report any financial interests.

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