



Imaging for the anterior segment specialist



John Dart, MD, receives the Castroviejo Medal from Elmer Tu, MD, following his lecture.

The Cornea Society-sponsored symposium at the American Academy of Ophthalmology's annual meeting included a variety of imaging topics. The session also included the Castroviejo Lecture given by **John Dart, MD**, on the topic of *Acanthamoeba* keratitis.

During the session, **Carol Shields, MD**, Philadelphia, discussed "Imaging of Suspicious Anterior Segment Lesions: UBM for Iris and Ciliary Body Lesions." She noted differences between using ultrasound biomicroscopy (UBM) and anterior segment-OCT (AS-OCT).

Dr. Shields noted that UBM is preferred if the tumor is deep and dark, particularly in the iris stroma, pigment epithelium, or ciliary body. Meanwhile, AS-OCT is preferred for superficial and

light lesions of cornea, conjunctiva, and iris stroma.

Dr. Shields also described her study of "Assessment of Anterior Segment Tumors with Ultrasound Biomicroscopy versus Anterior Segment Optical Coherence Tomography in 200 Cases." The study found that, for anterior segment tumors, UBM offered better visualization of all margins and overall better images for entire tumor configuration, Dr. Shields said. But these techniques can be complementary with tumor shape by UBM and corneal/angle/aqueous details by AS-OCT.

During the Castroviejo Lecture, Dr. Dart discussed *Acanthamoeba* keratitis, first noting that it is common in the U.S., Europe, and the U.K. He said that confocal, smear, PCR, and culture are

new diagnostic standards of care in probable non-bacterial and progressive keratitis.

Dr. Dart also discussed predicting poor outcomes, PHMB and chlorhexidine use, and protocol for how to treat. When infection relapse occurs, Dr. Dart said signs may include increased corneal/scleral/limbal inflammation and possibly ulceration and/or hypopyon. To manage this, he said to reculture for amoeba and bacteria, treat the presumed bacterial superinfection, and repeat the intensive 3-week course of anti-amoebics, using PHMB 0.06%, chlorhexidine 0.2%, and taper steroids slowly. Dr. Dart also summarized how to manage different complications including scleritis, hypermature cataracts, glaucoma, ulceration or a persistent defect, and perforation.

Dr. Dart stressed that it's important to think of amoeba on presentation, especially in contact lens users, before diagnosing herpes. He said to refer suspected non-bacterial and persistent keratitis for culture, PCR, and confocal microscopy. He also said to: choose your drugs and use a protocol; recognize and treat; and defer therapeutic penetrating keratoplasty for 9 months unless the cataract hypermatures. Outcomes remain poor in these cases, Dr. Dart said, and new drugs and formulations are needed.

CN

Editors' note: Dr. Shields has no relevant financial interests. Dr. Dart has financial interests with Nanometrics, S.I.F.I. S.p.A. Italy, and Santen.



WORLD CORNEA CONGRESS VIII

May 14-15, 2020

Immediately preceding the
ASCRS ASOA Annual Meeting

BOSTON

World Cornea Congress VIII Planning Committee

Program Directors:

- Kathryn Colby, MD, PhD
- Bennie Jeng, MD
- Elmer Tu, MD

Program Committee:

- Anthony Aldave, MD
- Jessica Ciralsky, MD
- Sophie Deng, MD
- Deepinder Dhaliwal, MD
- Luigi Fontana, MD
- Edward Holland, MD
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President's message

Dear Cornea Society members,

World Cornea Congress 2020! All eyes are on the quinquennial event to be held in Boston from May 14–15, 2020. The program organizers and planning committee members have been hard at work gathering the best and brightest people and ideas from around the world to meet and share everything having to do with corneal, ocular surface, and external disease at this always valuable and prestigious meeting. Learn about varied topics including new innovations in diagnosing and treating corneal infection, new paradigms in management of neurotrophic disease, incredible surgical techniques for corneal transplantation and anterior segment reconstruction, with much more. This program is packed with engaging speakers and topics that will have a broad interest to all anterior segment specialists. For those of you who have attended previous congresses, you know that you can't miss this one, and for those who have never attended before, you're in for a treat.

The fall has been an incredibly busy but very successful time of year for the Cornea Society. The core of those efforts revolved around the American Academy of Ophthalmology meeting in San Francisco where the Cornea Society was center stage. The Cornea and Eye Banking Forum was another success with cutting edge and innovative approaches to corneal disease that has no other venue. The program chairs, Michelle K. Rhee and Anthony J. Aldave should be congratulated on the program and organization of the meeting along with our vital partners at the EBAA. We had a lively discussion at the annual Fellowship Director's Breakfast about training requirements and recounted another highly regarded Cornea Fellows Educational Summit held in Atlanta for 50+ current cornea fellows from around the country. Jessica Ciralsky, Michael Straiko, and Greg Ogawa chaired the Cornea Fellows Educational Summit and did a fantastic job. The day after the Cornea and Eye Banking Forum, the AAO Cornea Subspecialty Day delivered again, both in content and audience enthusiasm. The results were much better than expected in terms of attendance and attendee evaluations. We want to thank our Senior Program Director, Jennifer Li, and her Associate Program Directors, Sanjay Patel and Sophie Deng, for their insight and hard work in bringing together another stellar program. Finally, our Castroviejo Symposium on anterior segment imaging topped by the Castroviejo Medalist Lecture, delivered by and honoring Professor John Dart of Moorfields Eye Hospital, provided a wealth of information for attendees.

The fall also saw departure of some of our vibrant board members. I want to thank Eduardo Alfonso, Shigeto Shimmura, and Luigi Fontana for their valuable input and work for the past 3 years on the board, as well as Bill Trattler for serving as our AAO Council Representative. A special thanks to Marian Macsai, our departing Immediate Past President, who has ably put an enormous amount of work into the society over the past several years. Her insights will be missed. New directors who will be joining us the first of the year are Jose Alvaro Gomes, Jose Guell, Vishal Jhanji, and Sonal Tuli. Welcome!

New officers for 2020 were also named. Deepinder Dhaliwal, just rotating off the board, will be VP of Industry Relations. Anthony Aldave will be assuming the position of VP for International Relations. Barry Lee will be starting the new position of Secretary and Woody van Meter will be taking over the role of Treasurer. Bennie Jeng will be President-Elect, moving up to the President's position in 2 years. Kathryn Colby will be taking over as President on Jan. 1, 2020. Maria Woodward will be heading to the AAO Council to represent the society and Sophie Deng will be succeeding as Scientific Program Chair. As a personal note, I've had an opportunity to work with all of these new officers, and it is a dynamic, intelligent group who will serve the society well. I have had the privilege of working with Dr. Colby closely over the last couple of years and found her to be hard working, responsible, and talented. I very much look forward to her leadership.

This President's message is a bittersweet one as it is my last as president of the Cornea Society with my term ending Dec. 31, 2019. It was an awesome responsibility to guide the Cornea Society these last 2 years, but I think that the society is stronger for all of the changes that we have made to prepare for its future. I still remain amazed at the array of talent in our subspecialty field and the grace of their willingness to work, share, and innovate together. I feel truly blessed to have had this opportunity to make a contribution, but, in return, have had the priceless opportunity to work alongside incredible physicians and people that make up the society. It has been an unforgettable honor to have been able to serve the society in this capacity, and I look forward to the society's continued growth and evolution.



Elmer Tu, MD

Cornea Society incoming officers, board members, and 2020 award winners

During the Cornea Society Board of Directors Meeting in October 2019, the society's president, **Elmer Tu, MD**, led a discussion and vote on the 2020 Officers Slate. The board voted unanimously in favor of the candidates listed below (terms will begin Jan. 1, 2020):

- President-Elect: **Bennie Jeng, MD**
- Treasurer: **Woody Van Meter, MD**
- Secretary: **Barry Lee, MD**
- Vice President, International Relations: **Anthony Aldave, MD**
- Vice President, Industry Relations: **Deepinder Dhaliwal, MD**

The board discussed and voted to recommend the following new Board Members-at-Large who were approved by the Members with Thesis at the Oct. 12, 2019, business meeting: **Vishal Jhanji, MD, Sonal Tuli, MD, Jose Gomes, MD, and Jose Guell, MD.**

In addition, the Executive Committee recommended the following appointments:

- Scientific Program Chair: **Sophie Deng, MD, PhD**
- AAO Councilor: **Maria Woodward, MD**

The board also announced the society's 2020 award winners. **Eduardo Alfonso, MD**, was selected as the 2020 Dohlman Award winner, and the 2020 Castroviejo Medal will be awarded to **Jayne Weiss, MD.**

"We're very excited about the new Board," said **Kathryn Colby, MD, PhD**, Cornea Society's current president-elect, adding that the society has brought in experienced leaders who have provided extensive service to other ophthalmology organizations. **CN**

New Cornea Society membership category introduced

The Cornea Society has introduced a new membership category: "Fellow of the Cornea Society."

Corneal specialists who have completed an AUPO-FCC-compliant cornea fellowship program and have been in practice treating patients with corneal disease for at least 4 years are eligible to apply in this new category.

Currently, the only members of the Cornea Society who can vote or hold office are the Members with Thesis, said **Kathryn Colby, MD, PhD**, Cornea Society president-elect. The purpose of this new membership category, she said, is to broaden the opportunities for involvement in the society. "We're hoping to get younger corneal

specialists engaged in shaping the future of the society as voting members and as society leaders."

AUPO-FCC-compliant fellowships undergo an ongoing vetting process, so we know that ophthalmologists completing these programs have met rigorous educational requirements recommended by the Cornea Society, Dr. Colby said. The Cornea Society, like any vibrant society, depends on an influx and the involvement of new members, she added.

The new membership category is in the process of being rolled out on the updated Cornea Society website. Additional information and the application became available online in November.

To apply, candidates must submit an application and have it endorsed in writing by a Member with Thesis of the

Society in good standing. A letter from the fellowship director attesting to the candidate's successful completion of their cornea fellowship, along with a brief personal statement from the applicant on their interest and activity in cornea since fellowship is also required. Once recommended by the Membership Committee, the candidate must then be approved by the Board of Directors.

Dr. Colby concluded, "We look forward to welcoming our younger colleagues as voting members of the Cornea Society. Please apply to be a Fellow of the Cornea Society. We need your ideas and involvement to make our society the best it can be." **CN**

Cornea and Eye Banking Forum Awards

There were a number of awards presented at this year's Cornea and Eye Banking Forum.

First, **Ivan Schwab, MD**, received the **Claes H. Dohlman, MD, PhD**, Award, which recognizes a lifetime of teaching excellence in the field of cornea and external disease. During the award presentation, Mark Mannis, MD, highlighted the number of residents and fellows Dr. Schwab has trained, as well as his unique "questions of the day,"

and many other valuable aspects of his teaching.

The R. Townley Paton Award was given this year to **Shahzad Mian, MD**. He gave the corresponding lecture on "Defining Competency for Cornea Surgeons: Fellowship and Beyond." Dr. Mian said one of the reasons this award is such a great honor is because Dr. Paton was so "patient focused." Dr. Mian went on to discuss the goal of fellowship programs to train physicians

who will improve lives through curing, treating, and preventing eye diseases by managing cornea, external diseases, and refractive surgery.

Challenges in fellowships include broad scope of practice, evolving surgical techniques, steep learning curve, limited scope of simulation, and lack of board certification, Dr. Mian said. To enhance fellowship curriculum, he suggested educational courses and considering additional educational pathways. He stressed valuable resources from the Cornea Society, namely the Cornea Fellows Educational Summit and Cornea Society University.

This year's **Richard C. Troutman, MD, DSc**, Prize Lecture & Award went to **Marina Bertolin, MSc**. She presented her paper on "Optimized Protocol for Regeneration of the Conjunctival Epithelium Using the Cell Suspension Technique."

First, she highlighted evaluation of the distribution of human conjunctival stem cells, noting that the inferior fornix is the ideal area to harvest the conjunctival biopsy.

She also discussed the establishment of the proper cell culturing conditions and said that the control condition must be used in the first passage on plastics, and the animal-free condition XF can be used for the final culture on scaffold. Next, Dr. Bertolin discussed the identification of the proper scaffold for cell suspension, saying that the gel is the ideal scaffold for growing epithelial conjunctival grafts using the cell suspension technique. She also described the process of characterization of the conjunctival grafts, adding that mainly the conjunctival markers are expressed. The stem cell content was also confirmed; CK19 is the ideal identity marker, Dr. Bertolin said. Goblet cells were also detected.

Finally, the Best Paper of Session Award went to **Shruti Sinha, MBBS, MS**, for her paper on "Prevalence of Persistent Corneal Epithelial Defects in Chronic Ocular Graft-Versus-Host Disease." The award includes a \$1,500 prize for the best paper presented during the Cornea and Eye Banking Forum and is limited to current fellows, residents, and/or medical students. **CN**



Ivan Schwab, MD, receives the Claes H. Dohlman, MD, PhD, Award from Elmer Tu, MD, at the Cornea and Eye Banking Forum.



Marina Bertolin, MSc, presents during the Cornea and Eye Banking Forum. She won this year's Richard C. Troutman, MD, DSc, Prize Lecture & Award.

CORNEASOCIETY.ORG

The screenshot shows the Cornea Society website home page. At the top, there is a navigation bar with links for "Join Cornea Society", "Contact Us", and "LOG IN". Below this is a secondary menu with "Who We Are", "Membership", "Meetings", "Cornea Society University", and "Member Resources". The main content area features the Cornea Society logo on the left and a large image of a human eye with a green iris on the right. The text "Cornea Society" is prominently displayed, followed by the tagline "Advancing the treatment of corneal disease". At the bottom, a blue banner contains the text: "The Cornea Society is an international society to promote the exchange of information in cornea and external disease."

The screenshot displays the Cornea Journal website. The top navigation bar includes "Log in or Register", "Subscribe to Journal", and "Get new issue alerts". The journal title "CORNEA" is prominently featured, along with the subtitle "The Journal of Cornea and External Disease". A search bar is located on the right. Below the navigation, the current issue is identified as "December 2019 - Volume 38 - Issue 12". A thumbnail of the journal cover is shown on the left. To the right, key information is listed: "Editor-in-Chief: Alan Sugar, MD.", "ISSN: 0277-3740", "Online ISSN: 1536-4798", "Frequency: 12 issues / year", "Ranking: 22/59 in Ophthalmology", and "Impact Factor: 2.313". A "Subscribe to eTOC" button is visible at the bottom right.

The screenshot shows the Cornea Society Video Library website. The top navigation bar is identical to the main website. The main content area features the "VIDEO LIBRARY" title next to a large image of a professional video camera. Below the title, there is a search bar labeled "Search Videos" and a filter section labeled "Filter" with dropdown menus for "By Meeting" and "By Topic".

The screenshot displays the Cornea Society News website. The title "Cornea Society News" is at the top. Below it, there is a grid of six news article thumbnails. Each thumbnail includes a small image, the article title, and the date. The articles are: "Cornea Society News August 2019", "Cornea Society News January 2019", "Cornea Society News September 2018", "Cornea Society News July 2018", "Cornea Society News April 2018", and "Cornea Society News January 2018".

The Cornea Society has a new portal for news, information and member benefits. It's the easiest way to register for meetings, renew your membership, and access the Cornea Journal, clinical videos, newsletters, kera-net, and much more.

Visit the new site at www.corneasociety.org



Cornea Society
Advancing the treatment of corneal disease

Cornea and Eye Banking Forum

This year's Cornea and Eye Banking Forum covered a variety of topics relating to cornea and transplantation

"Management of Limbal Stem Cell Deficiency and Corneal Stromal Opacification"

The first of two mini-symposiums focused on limbal stem cell deficiency (LSCD) and corneal stromal opacification, with presenters highlighting LSCD, autologous limbal stem cell transplantation, repair of corneal injuries using bioadhesive hydrogels, and cultivated human corneal keratocytes for corneal opacities.

Sophie Deng, MD, PhD, kicked off the session by discussing LSCD. Global consensus on the definition, classification, diagnosis and staging of LSCD was reached recently, she said. LSCD is caused by a loss of stem cells that leads to conjunctivalization of the corneal surface, abnormal corneal epithelial wound healing, loss of barrier between the conjunctiva and cornea, corneal opacity, and corneal neovascularization.

Dr. Deng said LSCD is described as "an ocular surface disease caused by a decrease in the population and/or function of corneal epithelial stem/progenitor cells." This decrease leads to the inability to sustain the normal homeostasis of the corneal epithelium, she said. LSCD may be acquired or hereditary, and diagnosis is based on clinical presentation (symptoms and signs). However, the signs of an abnormal epithelium can be subtle and often not specific to LSCD, Dr. Deng said, adding that adjunct diagnostic tests may be necessary (characterization of cells sampled from corneal surface or by in vivo imaging). The severity of the disease are graded into 3 stages, which could guide the treatment plans.

In her conclusion, Dr. Deng noted that a global consensus on treatment of LSCD will be published shortly.

Also during the session, **Nasim Annabi, PhD**, discussed repair of corneal injuries using bioadhesive hydrogels, specifically highlighting a product called GelCORE.

Corneal stroma defects may be caused by physical trauma, burns, inflammation, or infections/corneal ulcers, she said. The standard of care to handle these include cyanoacrylate glue, suturing, or tissue patch grafting/therapeutic corneal grafting, but all of these have significant disadvantages, Dr. Annabi said, including high costs, uncontrolled tissue healing, and risk of immune response (in case of grafts).

Dr. Annabi went on to describe GelCORE, a gel for corneal repair. She said the material used is made of gelatin-based photocrosslinkable biomaterials. GelCORE is more adhesive than commercially available sealants, and Dr. Annabi added that it's easy to apply, has tunable biomechanical properties, has a tunable retention period by varying polymer ratios, has strong adhesion, and can be used as drug-delivery platform.

"Management of Corneal Endothelial Dysfunction: Where Are We Heading?"

The second mini-symposium of the Cornea and Eye Banking Forum looked at options in the management of corneal endothelial dysfunction.

Ula Jurkunas, MD, discussed genetic therapies and Fuchs. The corneal endothelium, with aging and time, is disrupted by guttae, she said.

Fuchs is a late onset genetic disorder, and there are many ways to study the genetics of it, she said.

The most common, relevant gene is TCF4 repeat expansion. Dr. Jurkunas said there are studies underway to understand how TCF4 repeat expansion can be treated, and she noted that one way is to excise those repeats.

Dr. Jurkunas went on to discuss CRISPR-Cas9, which uses a viral vector

to perform gene editing in vivo. She noted that there is currently no work with this in cornea underway, however, it has been experimented with in retinal degenerations. The other technology, instead of packaging CRISPR-Cas9 into a viral particle, involves putting it into a nanoparticle, Dr. Jurkunas said.

She also mentioned using an anti-sense oligonucleotide (ASO), but noted that this is in a "lab stage" and not in trials.

Dr. Jurkunas offered several key points to consider when designing genetic therapies. First, she said to consider the role of guttae and variation in topographical distribution. Secondly, she said it's important to consider the interplay between gene and environment and suggested targeting modifiable factors. Lastly, she pointed to lessons learned from Descemet's stripping only: not all cells manifest the disease; peripheral cells may be a source of healthy cells; think more about cell migration and proliferation; and know the role of corneal endothelial progenitor cells. **CN**

Editors' note: Dr. Jurkunas has financial interests with Intellia. Drs. Deng and Annabi have no relevant financial interests.

Cornea Subspecialty Day recap

Subspecialty programming at AAO featured an entire day dedicated to cornea topics

Ectasia update

The theme of this year's Cornea Subspecialty Day at AAO was "Keeping Disease at Bay." The first section explored topics in ectasia.

Michael W. Belin, MD, kicked off the session by discussing imaging for keratoconus. Kmax has been used for a number of years, but it's a limited and outdated parameter because it only measures a single point and only changes in relatively late disease, he said. Dr. Belin suggested that the "holy grail" would allow the earliest possible identification with the goal of preserving or improving vision, not limiting damage after the fact. Kmax is no longer valid when the goal is to identify disease at its earliest stages. Dr. Belin then went on to discuss the ABCD classification, which is measured at the cone. He described it as: A) Anterior radius of curvature from a 3.0-mm zone centered on the thinnest point. B) Posterior (back) radius of curvature from a 3.0-mm zone centered on the thinnest point. C) Minimal corneal thickness (not apical). D) Best spectacle-corrected visual acuity.

The real goal of isn't just the classification, Dr. Belin said, but to determine and document true progression of the disease. This ABCD progression display tells you when you have statistically significant change on each anatomical layer, he said.

Asim Ali, MD, discussed management of pediatric keratoconus, which he said can be seen in children as young as 4 years old. In pediatric patients, it's a more severe stage of disease, he said, and can be associated with trisomy 21 (Down syndrome), vernal keratoconjunctivitis, and other conditions.

Diagnosis criteria is the same as with adults, Dr. Ali said, and a reliable topog-

raphy/tomography is critical. For these patients, it's key to have experienced technicians, he said. If topography is not possible, pachymetry/keratometry may be used or an exam under anesthesia, if needed. Retinoscopy generally detects late-stage disease, he added.

Dr. Ali also stressed the importance of caution in trisomy 21 patients because they may have thinner and steeper corneas at baseline. Progression can be much faster than in adults (but not in all patients). If the patient is suspect, he recommended following closely.

Corneal crosslinking is FDA approved for patients over 14 years old, Dr. Ali said. For younger patients, it's off label. Criteria for treatment varies between studies, he noted, and some advocate for treatment after diagnosis without waiting for progression.

In terms of crosslinking outcomes, Dr. Ali said that most studies report only 2-year outcomes (or less). He stressed the importance of following children in the long term because of the high rate of recurrence.

However, crosslinking is not the same as visual rehabilitation, Dr. Ali said. Many patients who cannot tolerate contact lenses will need to have surgery. He added that there are good outcomes in children with DALK and PKP, but there are no comparative studies between the procedures.

Dr. Ali prefers DALK, because it is advantageous in eye rubbers, developmental delay, and trisomy 21. He said it also offers greater tectonic strength and a decreased risk of rejection. He also suggested considering tarsorrhaphy with trisomy 21.

Keratoconus is often detected late in children and can progress quickly, Dr. Ali stressed. Crosslinking is an effective therapy but is associated with long-term failure and patients need ongoing follow up. Surgical therapy is often required in these patients.

Updates in keratoplasty and keratoprosthesis

During an afternoon session focusing on keratoplasty and keratoprosthesis topics, **Mark Terry, MD**, shared instances where he still turns to PK.

He first went through some of the obvious clinical settings for PK and also noted that there are a number of clinical settings where PK is just one option among many. Dr. Terry then went into detail on when he would choose PK in "controversial clinical settings." First, for fungal infections of the interface after DALK or EK, Dr. Terry recommended doing a PK.

Interface infections are sequestered from medical treatment, he said, and greater than 80% go on to PK even after medical treatment. You can also risk fungal endophthalmitis if medical therapy fails, he said.

Dr. Terry also mentioned ulcerations/infections requiring a 10-mm or larger graft, in which case he recommended using a hybrid graft. PK grafts that go to the limbus and beyond destroy the angle and get extensive iridocorneal adhesions that destroy the endothelium over time, he said. Dr. Terry defined a "hybrid" graft as a full thickness graft that is laid over a recipient bed that has a deep lamellar periphery and a central full thickness trephination. Using this, the angle is preserved, glaucoma is avoided, iridocorneal adhesions are prevented and astigmatism is minimized, Dr. Terry said. **CN**

Editors' note: Dr. Belin has relevant financial interests with Oculus, Avedro, and CXLO. Dr. Ali has no relevant financial interests. Dr. Terry has no relevant financial interests.