STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry .ca.gov

Continuing Education Course Approval Checklist

Title: Select Innovations in Pediatric Retina

Provider Name: Kaiser Permanente c/o Dr. Wendy Friedman

☑Completed Application
Open to all Optometrists? ☑Yes ☐No
Maintain Record Agreement? ☑Yes ☐No

☑Correct Application Fee

☑Detailed Course Summary

☑Detailed Course Outline

☑PowerPoint and/or other Presentation Materials

☐Advertising (optional)

☑CV for EACH Course Instructor

☑License Verification for Each Course Instructor
Disciplinary History? ☐Yes ☑No

OPTOMETRY

STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry.ca.gov

CONTINUING EDUCATION COURSE APPROVAL APPLICATION

$50 Mandatory Fee

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule, a detailed course outline and presentation materials (e.g., PowerPoint presentation). Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title	**Course Presentation Date**
Select Innovations in Pediatric Retina	09/17/2016

Course Provider Contact Information

Provider Name

Wendy (First) Friedman (Last) _____ (Middle)

Provider Mailing Address

Street 393 East Walnut St **City** Pasadena **State** CA **Zip** 91188

Provider Email Address Wendy.L.Friedman@kp.org

Will the proposed course be open to all California licensed optometrists?	☒ YES ☐ NO
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation?	☒ YES ☐ NO

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name

Irena (First) Tsui, MD (Last) _____ (Middle)

License Number _____	**License Type** _____
Phone Number (310) 825-7290	**Email Address** itsui@jsei.ucla.edu

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

_____ 1/9/17

Signature of Course Provider ***Date***

KAISER PERMANENTE®

Southern California Permanente Medical Group
Professional Education
393 East Walnut
Pasadena, California 91188
(626) 405-4644

November 21, 2016

Dear California Board of Optometry,

This letter is to correct the missing application pieces for the 2016 Ophthalmology Symposium at the Disneyland Hotel on Saturday, September 17, 2016

Enclosed is
- a check for $300.00
- a detailed summary of each course
- outlines for each course
- powerpoint slides – which can also be viewed on the website (link below)

The reason the application was late
- The delay was due to not knowing the status of one of our speakers (Nadia Waheed, MD) so the agenda wasn't finalized.
- She was originally scheduled to speak twice in the morning but then she informed us she was asked to present at a different symposium on the same day in San Diego. We didn't know until very close to the symposium if she would have to cancel or would be able to switch to an afternoon slot or she would only speak once and have another colleague take her other slot. What was finally settled upon is she would switch to the afternoon slot and give the other slot away to her colleague.

Your letter requested a CV for Dr. Garrick Chak.
- He was the chair of the committee and introduced the day and all the speakers – he didn't give any presentation.

Below is the link to our registration website that has more information and shows that Southern California Permanente Medical Group (accredited by the Institute for Medical Quality/California Medical Association (IMQ/CMA) to provide continuing medical education for physicians – and they have approved this symposium for ***6.5 AMA PRA Category 1 Credit(s)™***
https://www.signup4.net/public/ap.aspx?EID=PHYE530E&OID=50

I can email you soft copies (if you prefer) or if you need any more information, please feel free to contact me.

Sincerely,

Wendy Friedman
Meeting Planner
393 East Walnut, Pasadena, CA 91188 626) 405-4644 wendy.L.friedman@kp.org

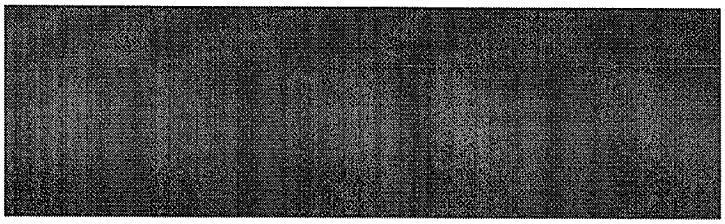
12:35 pm – 1:20 pm
Select Innovations in Pediatric Retina
SPEAKER: Irena Tsui, MD

DETAILED SUMMARY: Many Pediatric patients have retinal disease that can lead to life-long vision loss if not diagnosed and managed properly. Blindness from pediatric retinopathies not only involves vision loss for the patient, but also patient quality of life and burden on the family. Evidence based guidance into the latest diagnostic and therapeutic innovations of these challenging retinopathies may reduce the number of life years of blindness and increase the number of life years of vision.

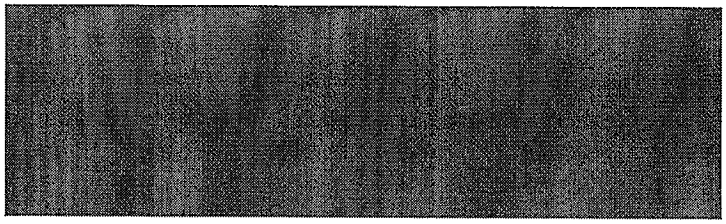
For Ophthalmologists, it is challenging to diagnose these diseases due to patient cooperation and the disorders can present very differently in children. It is also difficult to manage these diseases in the pediatric population as the medications and end goals of treatment may differ from that of the adult population.

OBJECTIVES - At the end of this activity, participants should be able to:
- Identify patient at risk for glaucoma; develop effective treatment plan to increase yrs of vision
- Diagnose retinal disease in the pediatric population; and formulate a medical/ surgical treatment plan to increase patient years of vision

TOPICAL OUTLINE
1. Risk Factors and Screening
    a. Updates
2. Epidemiology of ROP
    a. In US
        i. History
        ii. Changes in screening criteria
    b. Around the world
        i. Developing countries
3. Risk Calculators
    a. Examples
    b. Retinopathy of prematurity
        i. Methods
        ii. Outcome
    c. Final predictive algorithm
    d. Case studies
4. Anti-VEGF for ROP
    a. Case studies
5. Advanced retinal imaging
    a. Neonatal handheld OCT
    b. Preterm infant vs. term adult
    c. OCT angiography
    d. Study results
    e. Case study



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute



Update on Retinopathy of Prematurity

Irena Tsui, MD
Stein Eye Institute & Doheny Eye Institute, UCLA
Kaiser SCPMG Ophthalmology Symposium
September 17, 2016

Disclosures

- No commercial relationships
- No financial interests
- Off-label use of bevacizumab and ranibizumab for ROP

ROP Learning Objectives

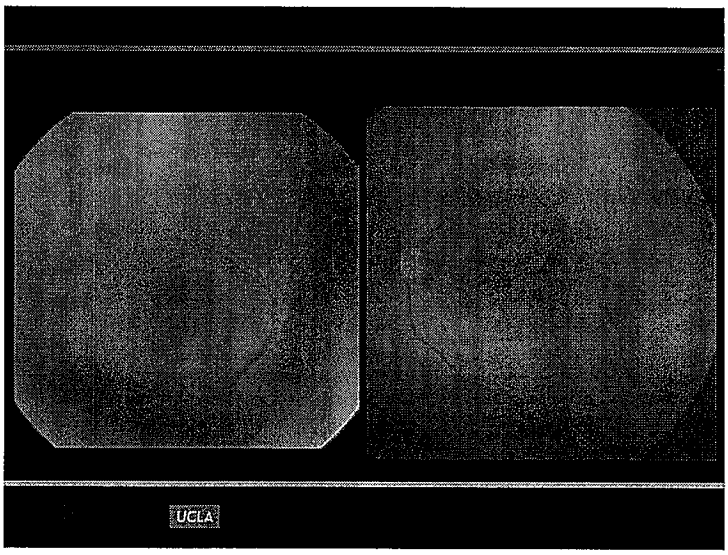
1. Update on risk factors and screening
2. Role of anti-VEGF treatment
3. Advanced retinal imaging of older children

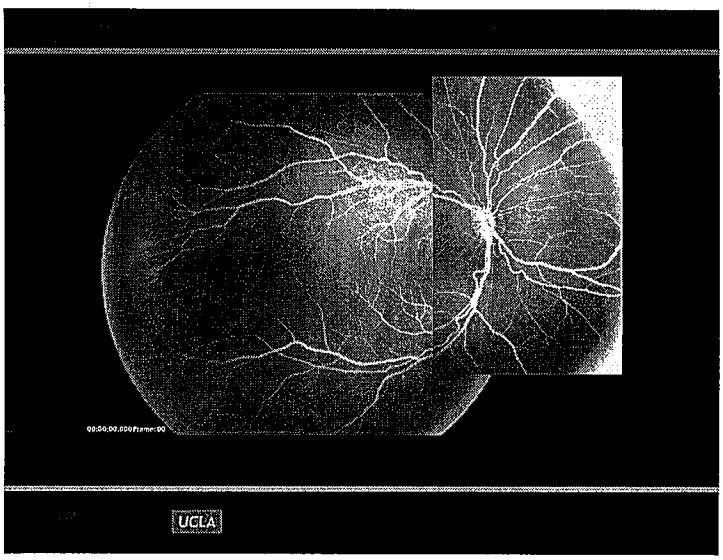
Case 1

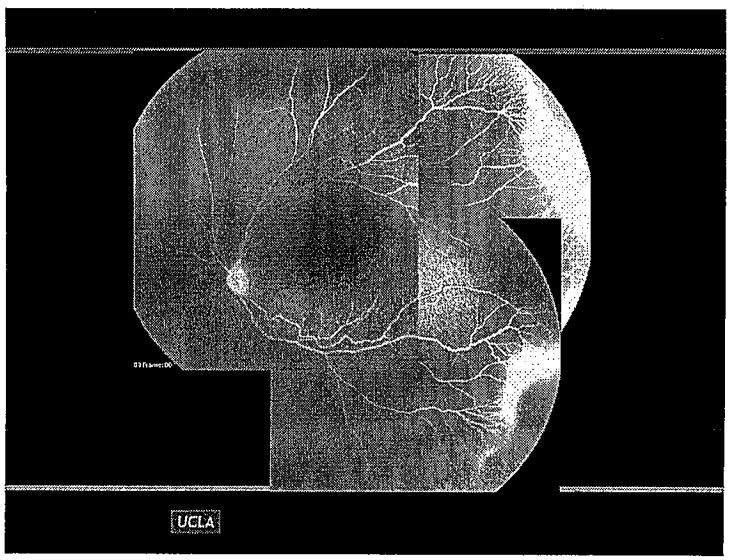
- Ex-27 week gestational age, BW 900 grams
- Born at community hospital, prolonged intubation, blood transfusions, presumed sepsis
- Parents were Mandarin Chinese speaking only
- Discharged x 2 weeks
- Referred by out-patient pediatrician
- Now 46 weeks

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

5



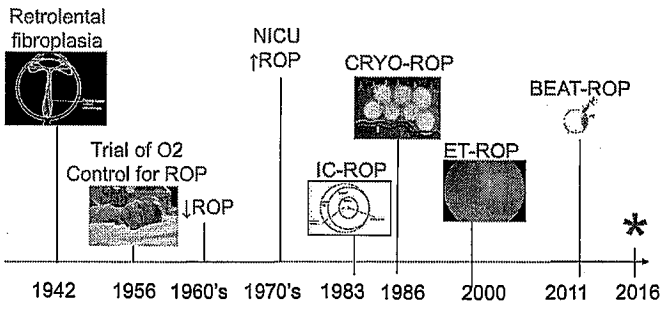




Epidemiology of ROP in the U.S.

- 1 out of every 8 births is premature
- Increasing with IVF and improved neonatal medicine
  - Increasing multiple gestation births and survival
- 3.9 million births (2009)
  - 28,000 meet ROP screening criteria
  - 15,000 infants develop ROP
  - 2,500 infants require treatment for ROP

ROP History



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

ROP ⇧⇧ Around the World

- "Third wave" of ROP
- Newly industrialized countries (i.e. India, Latin America)
- Increasing neonatal intensive care units (NICU)
- ROP prevention (i.e. decreasing oxygen use) and screening guidelines are lagging
- In developing countries, 60% of blind children die within a year of going blind

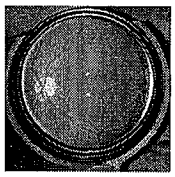
DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

ROP in Developing Countries

- Data and screening guidelines from industrialized countries do not apply
- Different screening criteria, babies born abroad with ROP are born relatively older and larger
- Gestational age unknown or unreliable
  - 32 weeks - 37 weeks
- Rely more on birth weight for screening
  - 1500g – 2000g

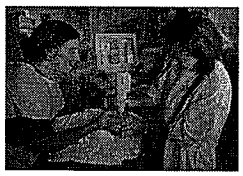
DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

ROP in Developing Countries



Work in Progress

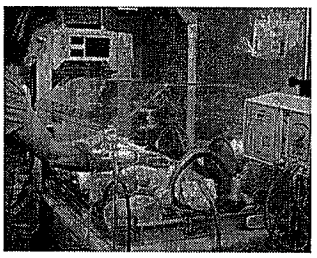
- Situation analysis
- Developing guidelines
- Increasing resources
  - telemedicine
- Awareness and advocacy



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Changes in US Screening Criteria

	1998	2006	2013
Gest Age	<34 weeks	<32 weeks	<30 weeks
Birth Weight		<1500 gms	<1500 gms



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

UCLA RR Treatment Data

- 2008-2011
- 185 infants screened
- 105 male (57%) /80 female (43%)
- 60 infants treated (32%)

GA (wks)	Screened (n=185)	Treated (n=60)	% Treated
22-24+	30	24	80%
25-28+	77	34	44%
29-31+	61	1	2%
32-34	16	1	6%

Weight (g)	Screened (n=180)	Treated (n=60)	% Treated
500-749	37	28	76%
750-999	48	20	42%
1000-1499	63	12	19%
1500-2450	32	0	0%

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Example Risk Calculators in Medicine

- Risk of cardiovascular disease (Framingham Study)
  - Gender, age, bp, chol, DM (yes/no), smoker (yes/no)
- Risk of cancer recurrence
- Risk of elderly falls
  - History of falls, agitation, visual impairment, frequent urination, poor mobility
- CRYO-ROP (n>4000, 23 centers)
  - BW, GA, ethnicity, transfer status, single/multiple birth, zone of first exam, severity of ROP, rate of progression of ROP

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

15

Retinopathy of Prematurity

- Known risk factors
  - Birth age, birth weight, excessive oxygen use
- Myriad of other reported risk factors
  - Weigh gain, twin status, anemia, blood transfusion, intubation, necrotizing enterocolitis, blood transfusions, PDA, infections, sepsis
- Purpose of UCLA study
  - To create a risk calculator for treatment requiring ROP at UCLA to assist NICU communication, parent counseling, and physician anticipation

Methods

- Prospective cohort of babies screened for ROP at two UCLA NICU's
- Risk factors collected from electronic medical record at 1 month of age
  - Birth data: Gender, gestational age, birth weight, birth length, head circumference, multiple birth
  - 28-30 day data: Weight gain, intubation, mean SaO2/24 hours, IVH, PDA surg, NEC surg, intubation, # surgeries, positive blood culture, transfer status
- Excluded babies transferred in before 1 month or with incomplete data (transferred back before ROP outcome)

Outcome

- Treatment requiring ROP
- Management guidelines
  - AP-ROP/Zone 1 disease encourage anti-VEGF
  - Zone 2 disease offer anti-VEGF or laser
  - Zone 3 disease recommend laser

Cohort Description

- 442 infants screened for ROP
  - Excluded infants with incomplete data
- 282 infants included for analysis
  - 124 males: 158 females
- Birth age
  - Average 27 weeks, range 22-34 weeks
- Birth weight
  - Average 1150 grams, range 410-2300 grams
- Treatment
  - 67 lasers, 7 anti-VEGF injections

Statistical Analysis

- Bivariate analysis with p-values obtained by Fisher's exact test or chi-square test
- Multiple logistic regression, least absolute shrinkage and selection operator (LASSO)
- Restricted cubic splines

Bivariate Analysis

- 13/20 variables increased risk for ROP
  - GA, BW, BHC, BL, weight gain @ 1 month, mean SaO2/24 hrs, intubation status, presence of IVH, PDA requiring treatment, necrotizing enterocolitis requiring surgical intervention, total number of surgeries, + blood cultures, transfer status
- First-step risk calculator using 13/20 variables
  - 93.8% sensitivity
  - 71.2% specificity

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Multivariate analysis resulted in three major predictive risk factors for ROP

	OR (95% CI)	p-value
Gest age (per week)	0.646 (0.510-0.820)	< 0.001
Birth weight (per gm)	0.998 (0.997-1.00)	0.07
Transfer In (y/n)	0.439 (0.196-0.981)	0.04

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Final Predictive Algorithm of UCLA Risk Calculator

- 91.4% sensitivity
- 72.6% specificity
- 82% accuracy

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Transfer Status – 77 infants transferred in

- 75/77 transferred for higher level of care, congenital heart disease (PDA requiring surgery), NEC
- 2/77 transferred for non-medical reasons such as geographical convenience

Limitations of the Study

- Only be applicable to UCLA
- Referral bias – rate of treatment requiring ROP in this study was 25%
- There remains unaccounted variables

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Potential Future Directions

- Validation of risk calculator in a separate cohort at UCLA
- Expand to create personalized risk calculators elsewhere
- Expand to include imaging data at 1 month

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Study Conclusions

- UCLA specific risk calculator with 3 factors at 1 month predicts treatment requiring ROP with 82% accuracy
- Useful for communication and setting expectations in team setting

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Review of Risk Calculators for ROP

- Is it safe to screen less babies based on risk calculators?
- 23 papers reviewed which looked at predictive algorithms for ROP
- All involved GA and BW
  - WINROP(2006): rate of weight gain (IGF-1)
  - CHOP (2012): rate of weight gain
  - eROP(2015): added prior exam findings
- Concluded not enough evidence to safely change current screening criteria

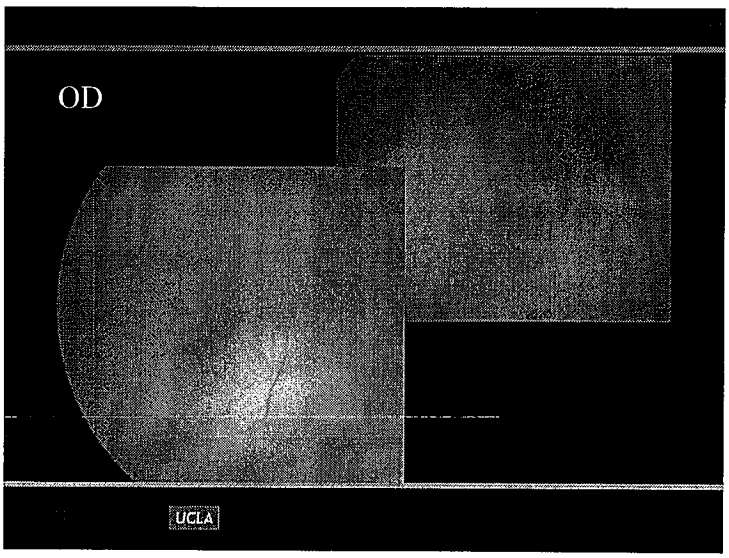
Hutchinson et al, Ophthalmology, 2016.

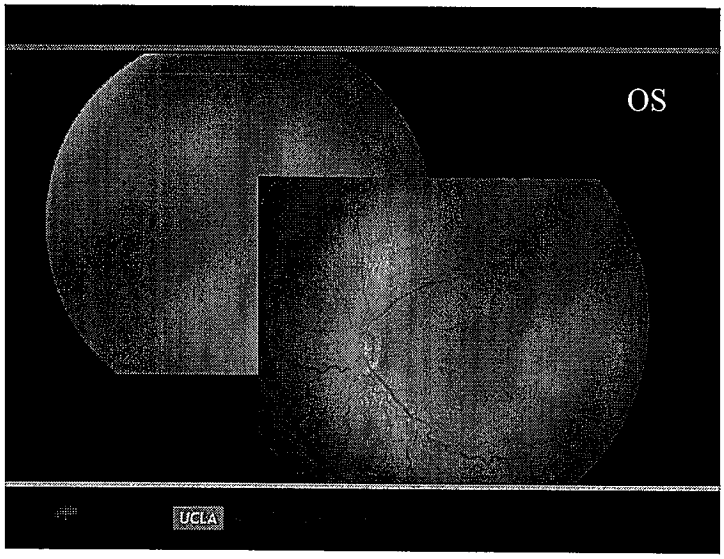
Add Case:

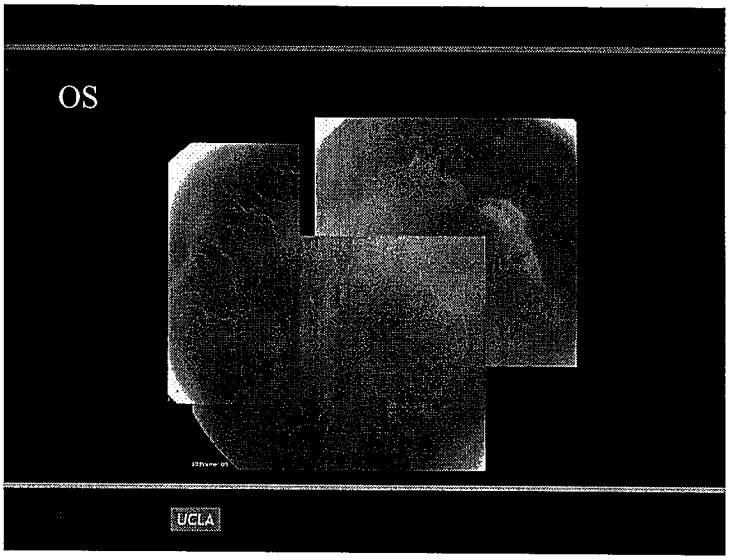
- Hinton

Case 2

- Ex 25-weeker, BW 670 grams
- IVF, twin, grade 3 IVH, prolonged ventilation, presumed sepsis, s/p PDA ligation, transferred from outside hospital
- Now 35-4/7 weeks

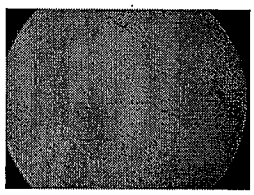






Cryotherapy for ROP Study

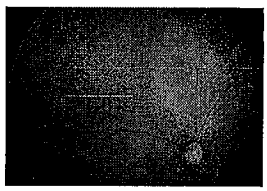
- 1986-1988 (n=291 infants)
- Inclusion criteria:
  - Birth weight ≤1250g
  - Threshold ROP
    - Stage 3, Plus
    - 5 contiguous clock hrs
    - 8 cumulative clock hrs
- Treatment: cryo one eye v. observation other eye
- Unfavorable outcome at 3 months
  - 22% v. 43%



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Early Treatment of ROP Study

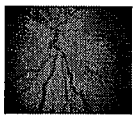
- 2000-2002 (n=370)
- Inclusion criteria:
  - Birth weight ≤1250g
  - Pre-threshold ROP
    - Z1, Any stage
    - Z2, S2, Plus
    - Z2, S3, No Plus
- Treatment: Early v. CRYO-ROP treatment criteria based on risk calculator set to 15%



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Current Clinical Practice

- Type 1 Pre-Threshold (Treat)
  - Zone 1, any stage ROP with Plus
  - Zone 1, Stage 3, with or without Plus
  - Zone 2, Stage 2 or 3, with Plus



- Type 2 Pre-Threshold (Watch and Wait)
  - Zone 1, Stage 1 or 2 without Plus
  - Zone 2, Stage 3 without Plus

Potential Side Effects of ROP Laser

- Systemic stress of laser procedure
- Decreased visual field
- Progressive myopia
- Macular dragging
- Cataract
- Posterior synechiae
- Anterior segment ischemia

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Can we do even better?

- Natural history
  - 1/2 of observed eyes had poor outcomes
- Threshold (CRYO-ROP)
  - 1/3 treated eyes had poor outcomes
- Pre-threshold (ET-ROP)
  - 1/8 treated eyes had poor outcomes

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Anti-VEGF for ROP

- Unknown systemic side effects
  - Systemic VEGF suppression for 4-8 weeks after bevacizumab
- First reported in Mexico, 2006
- Compassionate use
  - Poor view to complete laser treatment
  - Refractory to laser treatment
  - No alternative

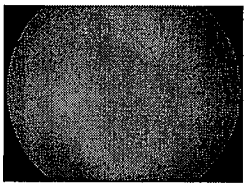
DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

BEAT-ROP (2011)

- Zone 1 (n=67) or posterior zone 2 (n=83), stage 3, plus
  - Bilateral 0.0625mg/0.025cc bevacizumab
  - Bilateral conventional laser
- Endpoint: ROP recurrence (4% v 42%) by 54 weeks
  - Zone 1: bevacizumab advantageous
  - Zone 2: equivalent outcomes
- Criticisms: 50% Hispanic infants, threshold disease, high rates of laser failure

Aggressive Posterior ROP

- Uncommon, rapidly progressive, severe
- Presents at earlier gestational age
- Prominence of plus disease
- Typically has hemorrhage
- Ill-defined border
- Can skip through stages
- High rates of laser failure



DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

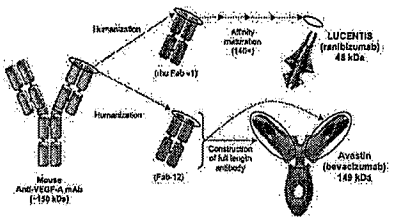
Clinical Practice

- Offer as an option in AP-ROP, Zone 1 disease, posterior zone 2 disease
- Factors to consider – parental understanding of risks and benefits, long-term follow-up required, likely need follow-up laser

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

Which Anti-VEGF for ROP?

- Avastin most used anti-VEGF – cheaper, lasts longer
- Lucentis – decreases systemic risk
  - Shorter half life, less systemic side effects, less chance of contamination

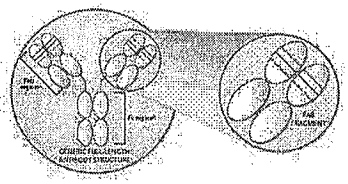


DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

LUCENTIS Was Designed for Rapid Systemic Clearance Through the Removal of the Fc Region[1,2]

LUCENTIS is an antigen-binding fragment (Fab) that was designed without an Fc region

- Removal of the Fc region means LUCENTIS is not subject to FcRn recycling, resulting in rapid systemic clearance
  - Maximum serum concentrations have been observed approximately 1 day after intravitreal administration and were approximately 0.3 ng/mL to 2.36 ng/mL[1]



Aflibercept (Eylea)

- Recombinant fusion protein from human VEGF receptors
- Binds to VEGF-A, VEGF-B, and platelet derived growth factor
- Potential for even higher side effects
- Adult data shows similar side effect profile as Lucentis

Avastin v. Lucentis at UCLA

- 10 eyes/6 infants received anti-VEGF for Zone 1 or posterior Zone 2 ROP
- 5/6 eyes after Lucentis had recurrence of ROP (average 6 weeks after injection)
- No Avastin eyes had reactivation

Table 1. Mean GA and Mean Birth Weight of Infants of Injected Infants, Lasered Infants, and Infants Without Treatment

Treatment Group	N (%)	Mean GA (weeks)	Mean Birth Weight (g)
Anti-VEGF	6 (4)	23.48	620
Laser only	20 (14)	25.76	802
None	116 (82)	28.45	1174
Total	142	$P < 0.01$	$P < 0.01$

Which Anti-VEGF Summary

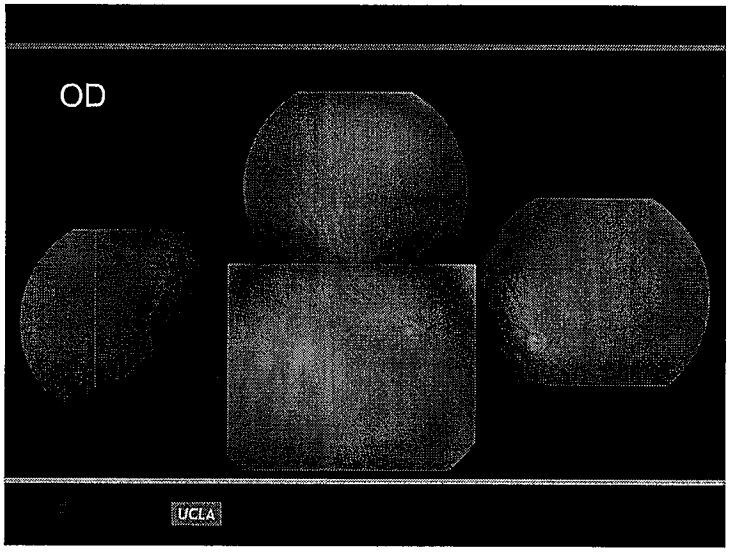
- Avastin most used anti-VEGF for ROP
- Lucentis is becoming more popular
  - Less chance of contamination (single use vial)
  - Shorter half-life
  - Less systemic VEGF suppression
  - Earlier recurrence of ROP
  - More complete retinal vascularization
  - Similar refractive outcomes as Avastin

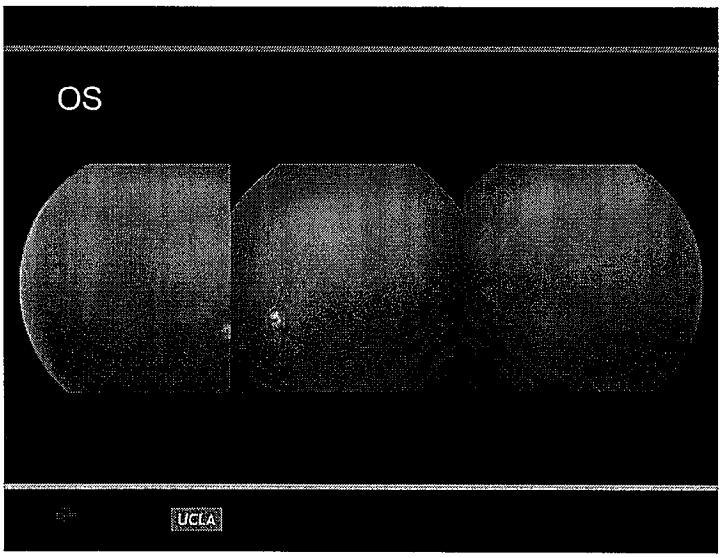
Case 4

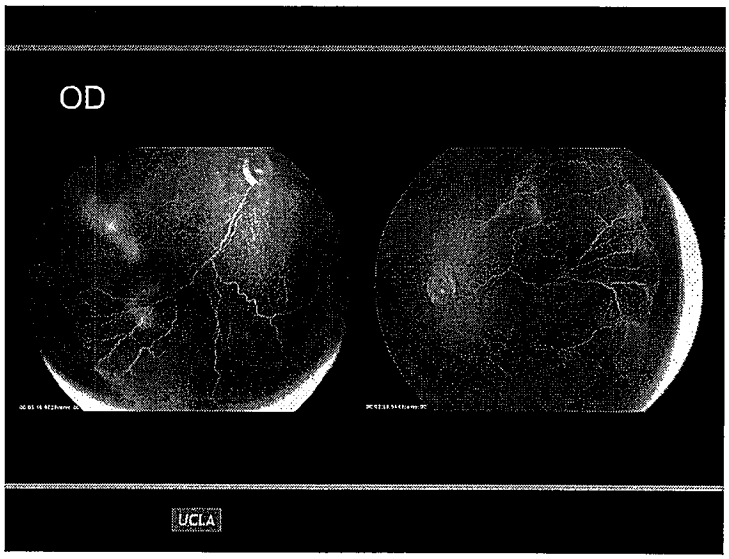
- Ex 24-5/7 weeker
- BW 540 grams
- s/p Avastin 0.625mg OU @ 34 weeks
- Now 48 weeks

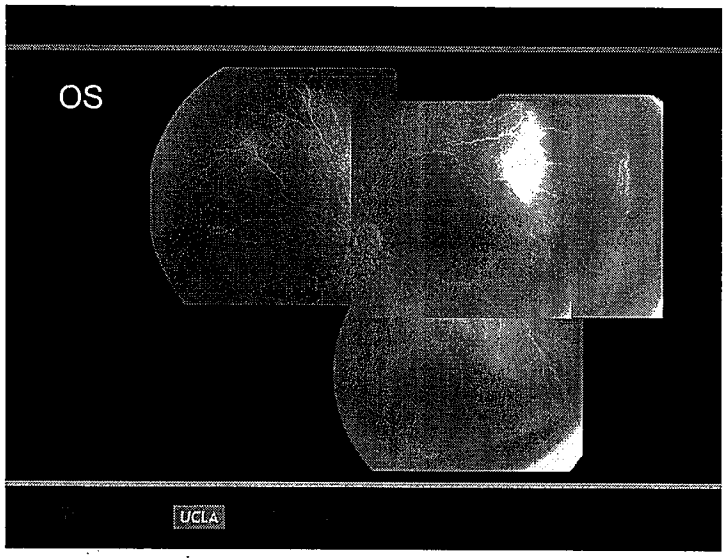
DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

49





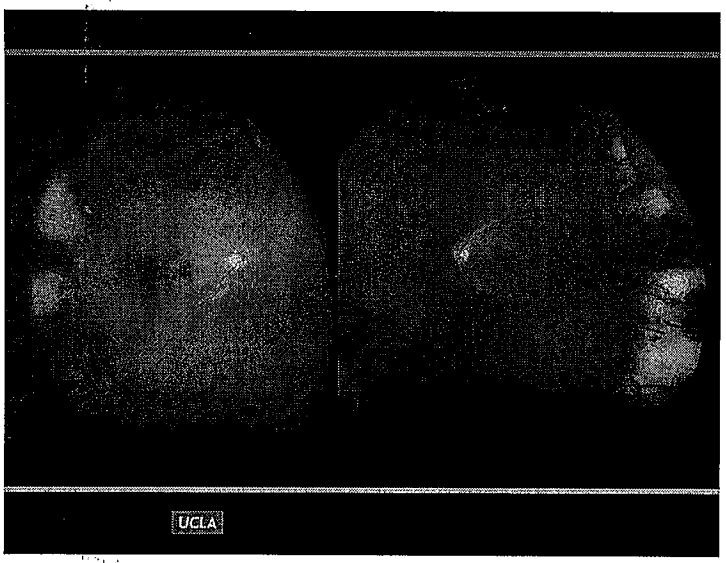


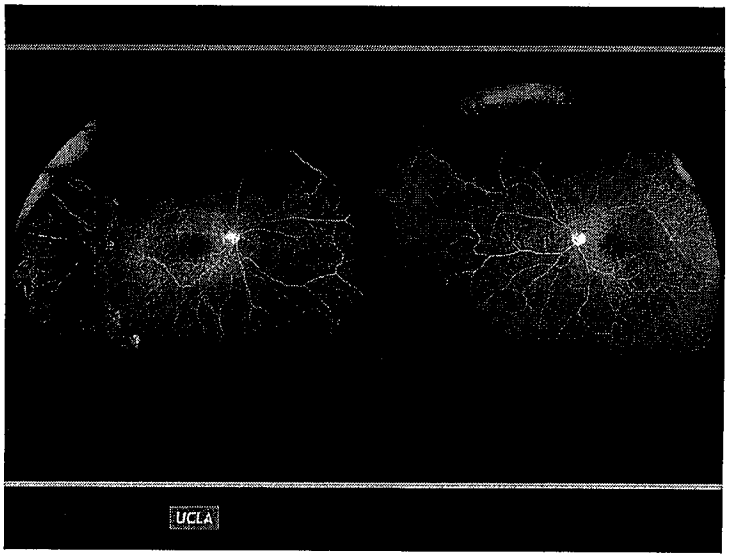


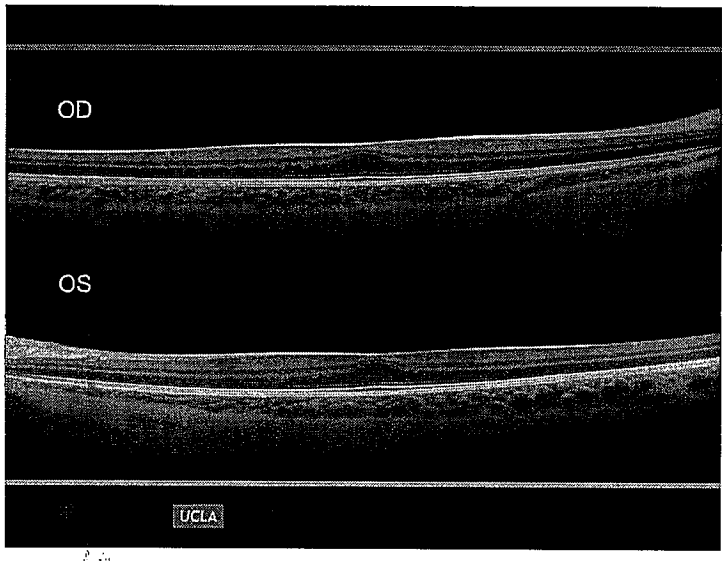
Case 5

- Now 9 years old, developmentally normal
- Ex 27-5/7 week GA, BW: 1145 g
- PMH: preterm, twin A of IVF pregnancy, NEC s/p ileostomy and bowel resection
- POHx: s/p peripheral laser OU for Zone 2 Stage 3 ROP OU
- WRx
  - -0.50 +1.75 x090 (20/25)
  - -0.75 +1.75 x090 (20/25)

DOHENY EYE INSTITUTE | UCLA Stein Eye Institute



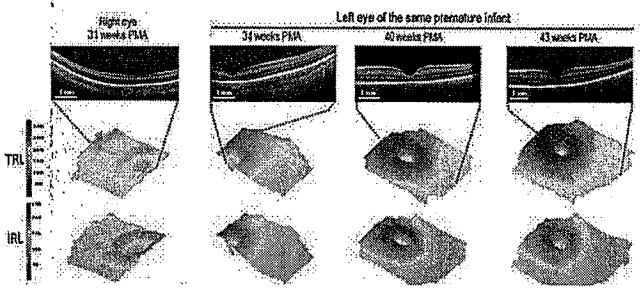




Neonatal Handheld OCT

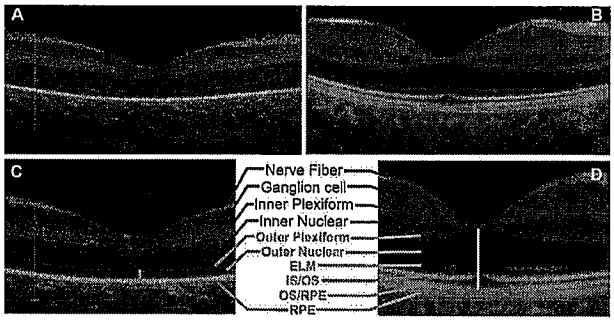
- Envisu (Biotigen, NC)
- Technically, not easy to acquire images
- Until recently, did not have an infra-red picture to help find position on fundus
- Differences in infants eye: axial length, refractive error, corneal steepening – can change reference arm settings based on infants age

Imaging foveal development *in vivo*



Maldonado et al. 2011 *Ophthalmol*

Preterm Infant v. Term Adult



Maldonado et al. 2011 *Ophthalmol*

Foveal Development in ROP

- Foveal maturation is delayed in prematurity and ROP

Vajzovic et al. 2015 *IOVS*

- Foveal hypoplasia

Table 2 Foveal metrics and foveal thickness in preterm children and full-term controls.

	Preterm Mean (SE)	Full-term Mean (SE)	p Value	Preterm No ROP	Preterm Regressed ROP	Preterm Laser
Foveal diameter (μm)	1759.3 (273.0)	1765.3 (60.8)	>0.5	1751.9 (149.5)	1697.15 (187.4)	1547.9 (208.4)
FAZ diameter (μm)	410.5 (47.5)	792.3 (46.8)	<0.0001	493.3 (33.7)	374.9 (73.8)	398.6 (169.9)
Foveal depth (μm)	89.0 (5.9)	123.6 (6.1)	<0.0001	85.0 (12.5)	72.1 (8.6)	62.6 (4.9)
Foveal slope (degree)	6.3 (1.0)	14.6 (0.5)	<0.0001	8.7 (2.2)	5.6 (1.2)	5.1 (0.6)
Total foveal thickness (μm)	296.3 (11.8)	219.0 (3.9)	<0.0001	253.2 (11.3)	295.9 (18.8)	307.9 (9.0)
ONL ratio	2.05 (0.09)	1.54 (0.04)	<0.0001	1.8 (0.12)	1.9 (0.13)	2.2 (0.06)

FAZ, foveal avascular zone; INL, nuclear layer; ROP, retinopathy of prematurity.

Yanni et al. 2012 *BJO*

CME found in 50% of premature infants

Fig. 6. Cross-sectional SD-OCT image showing retinal cystoid structures or schisis present in the inner nuclear layer with associated thickening and deformation of the photoreceptor layer elevating the outer plexiform layer. This session had been graded by the clinical examiner as Stage 3 ROP disease in Zone II, no cystoid structures.

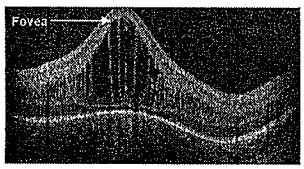


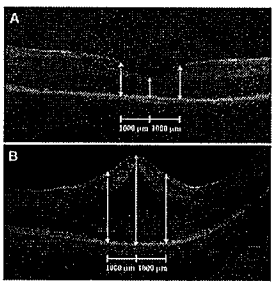
Fig. 8. Cross-sectional SD-OCT image showing a severe case of macular edema with gross elevation of the central fovea and vertically elongated hyporeflective structures alternating with thin strands of hyperreflectivity. This eye reached Stage 2 disease in Zone III and did not receive laser treatment.

Did not correlate to ROP outcomes

Lee et al. Retina, 2011.
Maldonado et al. Archives, 2012.

CME prognosticated neuro development

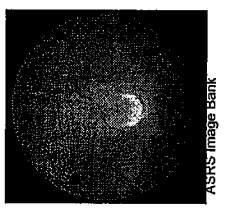
- 53 children screened with SD-OCT in the NICU
  - 31 with CME
- At 18-24 months of age
  - Cognitive, language, motor assessment
- Adjusted for GA, BW
- CME correlated strongly with subsequent neuro development



Rothman et al., Ophthalmology, 2015

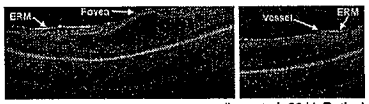
Late Sequelae Retinal Complications of ROP

- Pathological myopia
- Strabismus
- Macular dragging
- Retinal detachment



Additional Retinal Sequelae in SD-OCT Era

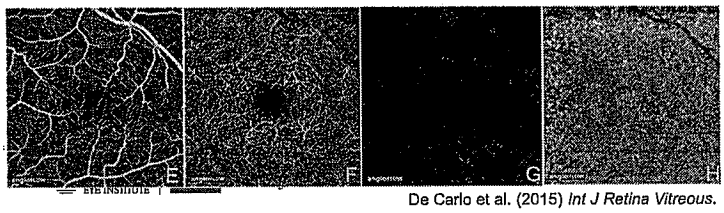
- Foveal plana
- Cystoid macula edema
- Epiretinal membrane
- Retinoschisis
- Retinal vascular anomalies



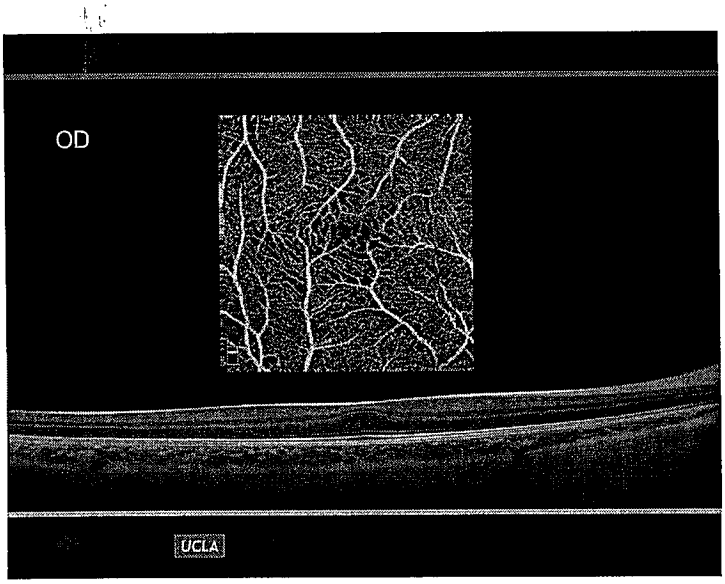
(Lee et al. 2011 *Retina*)

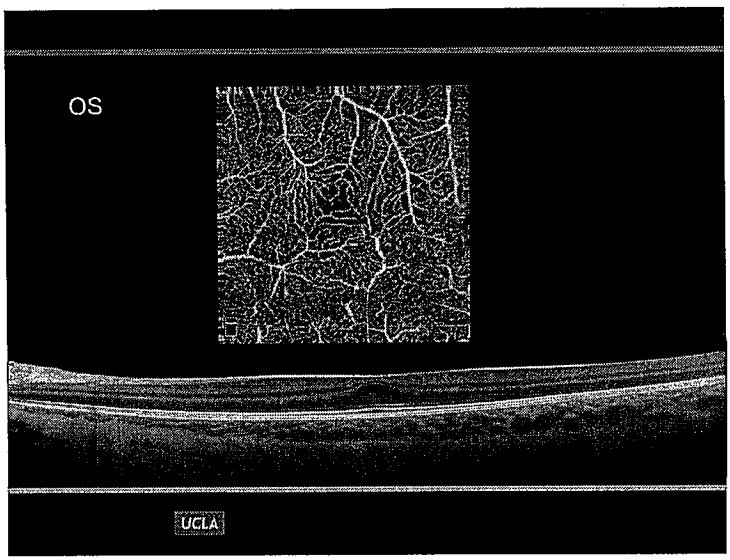
OCT Angiography

- Non-invasive methodology for assessing blood flow
- Generates volumetric data set by comparing sequential b-scans for differences in the backscattered OCT signal
- Automated segmentation – SCP, DCP, outer retina, choriocapillaris
- Unable to detect leakage



De Carlo et al. (2015) *Int J Retina Vitreous.*





UCLA Study Purpose

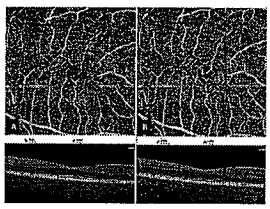
- To compare FAZ on OCTA in children born premature and at full term

Inclusion Criteria

- Age 4-12 years old
- Born before 37 weeks of gestational age
- Age-matched controls

Imaging Tool and Analysis

- OCTA, Avanti, Optovue (Freemont, CA)
- 3x3 scans, SCP, DCP
- Measurement of FAZ area (mm^2)
- Measurement of central foveal thickness
- Measurement of vessel density

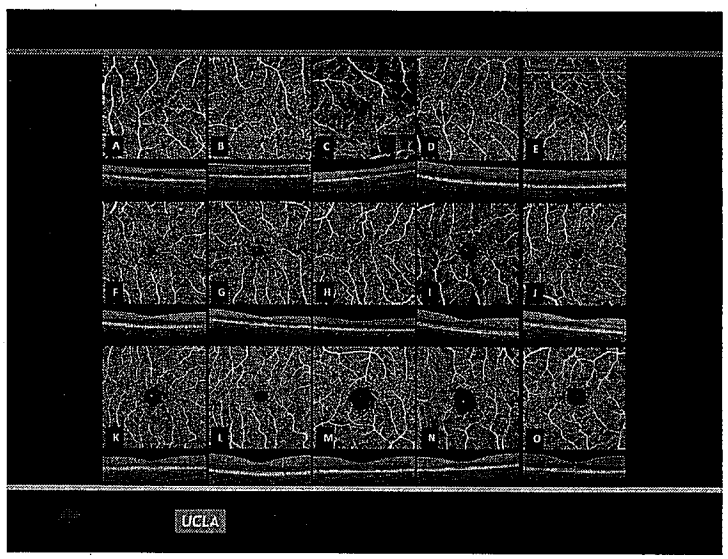


Results

- 43 eyes of 26 children
  - 28 eyes of 15 former preterm children
  - 15 eyes of 11 former term children
- 43% of preterm infants with distinct FAZ
- Eyes with no distinct FAZ
  - gestational age <29 weeks and
  - birth weight was <1480 grams
- All controls with distinct FAZ

Results

	Preterm Only	Preterm + Laser	Full-term control	P-value
GA (weeks)	25.8±1.2	28±2.4	39±1	P<0.001 ‡
BW (grams)	871.1±172.6	1070±290.1	2992.6±217.8	P<0.001 ‡
FAZ area (mm^2)	0.02±0.03	0.06±0.06	0.26±0.09	P<0.001 ‡
CFT (µm)	317.5±37.7	272±17.1	247.1±18.1	P<0.001 ‡
Vessel Density (%)	44.4±4.5	40.7±4.1	33.4±5.4	P<0.001 ‡

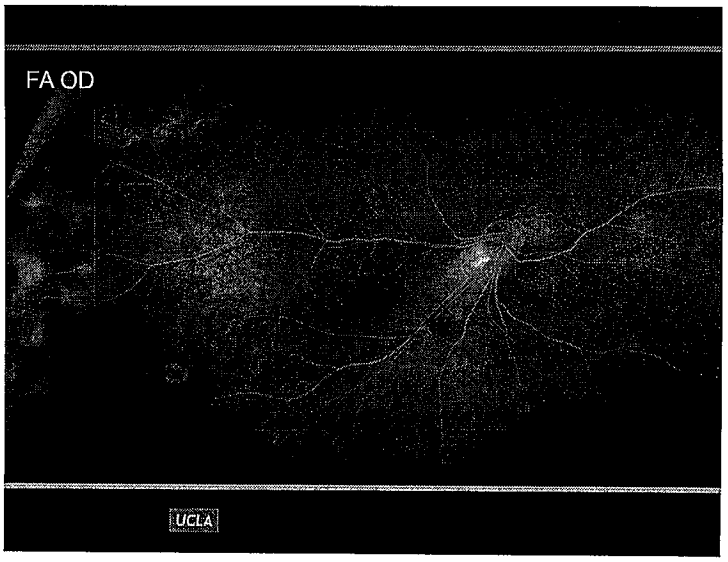


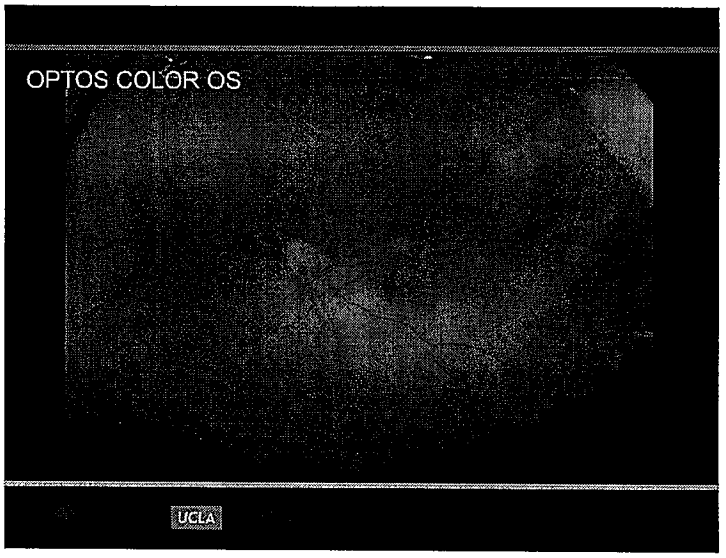
Case 6

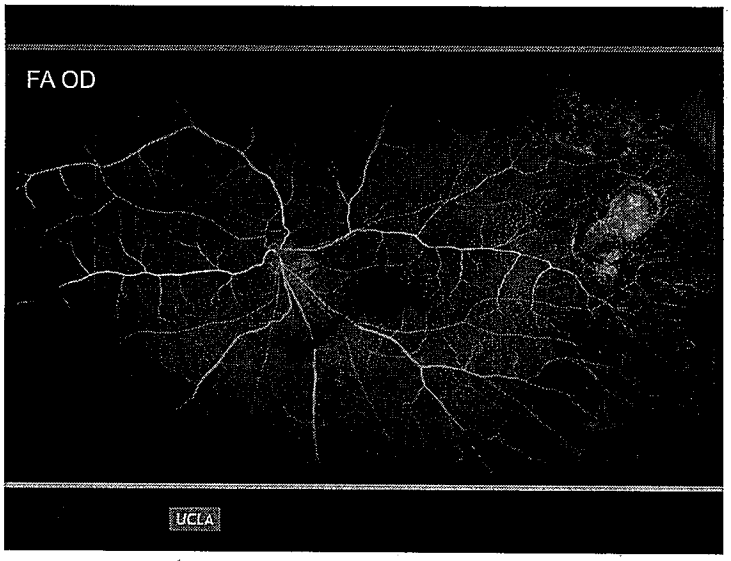
- 38 year old female physician
- Ex- 27 week GA, 1750 grams BW
- s/p ROP cryotherapy as an infant
- Myopic (-8.00D, -6.50D)
- VA: 20/100, 20/25

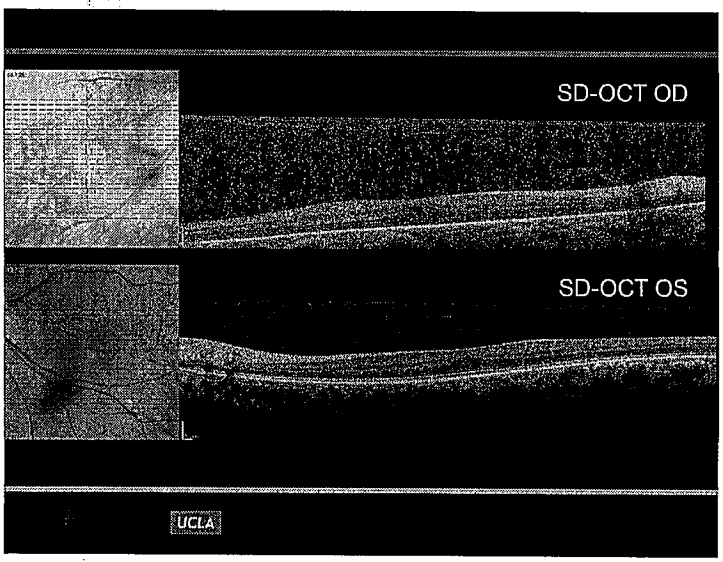
DOHENY EYE INSTITUTE | UCLA Stein Eye Institute

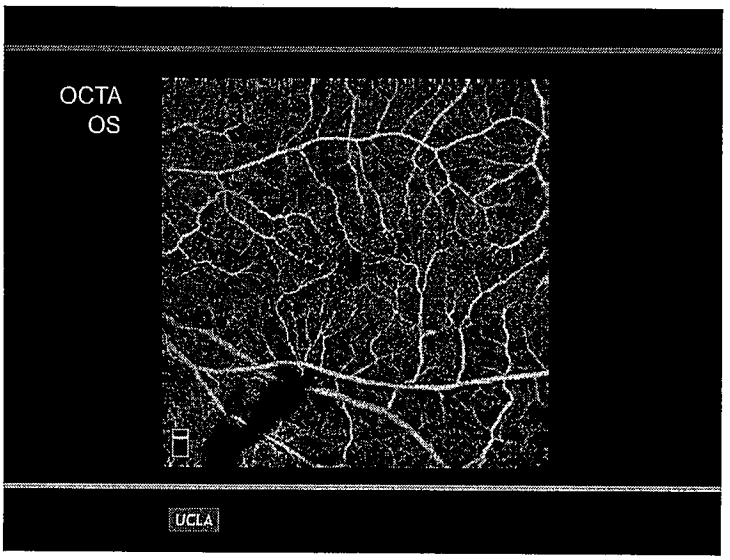
74




OPTOS COLOR OS
UCLA


FA OD
UCLA


SD-OCT OD
SD-OCT OS
UCLA


OCTA
OS
UCLA

ROP Learning Objectives

1. Update on risk factors and screening
   - GA and BW
2. Role of Anti-VEGF Treatment
   - Avastin v. Lucentis different
3. Advanced retinal imaging of older children
   - SD-OCT and OCTA providing new information

Acknowledgements

- Khalil Falavarjani, MD
- Bobby Lalane, MD
- Aaron Nagiel, MD, PhD
- Vas Sadda, MD
- David Sarraf, MD
- Ryan Wong, MD
- Madeline Yung, MD

Irena Tsui, M.D.
Curriculum Vitae

CONTACT INFORMATION:

1333 18th Street
Unit 2
Santa Monica, CA 90404
Cell Phone: 267-872-3989
E-mail: irena.tsui@gmail.com

EDUCATION:

B.A., Biology Honors Program
Johns Hopkins University
Baltimore, MD
1996-2000

M.D., Medicine
University of Pennsylvania School of Medicine
Philadelphia, PA
2000-2004

Internship, Transitional
Presbyterian Medical Center
University of Pennsylvania School of Medicine
Philadelphia, PA
2004-2005

Residency, Ophthalmology
Edward Harkness Eye Institute
Columbia University School of Medicine
New York, NY
2005-2008

Fellowship, Vitreoretinal
Jules Stein Eye Institute
University of California at Los Angeles
David Geffen School of Medicine
Los Angeles, CA
2008-2010

LICENSURE:

California, A103523, 4/18/2008 – current

BOARD CERTIFICATION:

American Board of Ophthalmology
Issue: 2010; Expiration: 2020

Irena Tsui, M.D.

PROFESSIONAL EXPERIENCE:

Present Positions:

Assistant Professor of Ophthalmology
Stein Eye Institute and Doheny Eye Institute
University of California at Los Angeles
David Geffen School of Medicine
Los Angeles, CA
January 2012 –

Physician, Vitreoretinal Service
Department of Ophthalmology
Veterans Affairs Greater Los Angeles
Healthcare System
Los Angeles, CA
January 2012 –

Previous Position:

Assistant Professor of Ophthalmology
Department of Ophthalmology
Albert Einstein College of Medicine
Montefiore Medical Center
Bronx, NY
2010-2011

PROFESSIONAL ACTIVITIES:

Committee Service:

Retina Fellowship Selection Committee
Stein Eye Institute
2012 –

QI/Clinical Committee
Stein Eye Institute
2012 –

UCLA Pediatric Surgery Committee
Ronald Reagan UCLA
2015 –

Community Service:

Volunteer, Care Harbor LA
UCLA Volunteer Center
Los Angeles, CA
2012 –

Professional Associations and Scholarly Societies:

– Association for Research in Vision and Ophthalmology, 2005 –

– Western Retina Study Club, 2008 –
– Women in Ophthalmology, 2009 –
– American Academy of Ophthalmology, 2010 –
– Los Angeles Society of Ophthalmology, 2011 –
– Los Angeles County Medical Association, 2013 –
– Association of Pediatric Retina Surgeons, 2014 –
– Retina Society, 2014 –

Ad Hoc Reviewer:
– Clinical Ophthalmology, 2011 –
– Ophthalmic Surgery Lasers and Imaging Retina, 2012 –
– Investigative Ophthalmology and Visual Sciences, 2013 –
– Retina, The Journal of Vitreoretinal Diseases, 2014 –
– Journal of Pediatric Ophthalmology & Strabismus, 2015 –
– Ocular Immunology and Inflammation, 2015 –
– International Journal of Retina and Vitreous, 2015 –
– RETINA The Journal of Retinal and Vitreous Diseases, 2015 –
– British Journal of Ophthalmology, 2016 –
– Asia-Pacific Journal of Ophthalmology, 2016 –
– Editors of Pediatrics, 2016 –
– Expert Review of Medical Devices, 2016 –

HONORS AND SPECIAL AWARDS: Annual Fellow's Research Award, "Wide-Field Imaging for the Detection of Macular Edema," Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, May 2010

RESEARCH GRANTS AND FELLOWSHIPS RECEIVED:

1. Oppenheimer Family Foundation Award, "Use of a Mobile Application to Enhance Diabetic Healthcare," December 2012.

2. Harold and Pauline Price Fellowship, 2008-2010.

LECTURES AND PRESENTATIONS:

1. "Scotoma after Orthopedic Surgery," Annual Retina Club Meeting, Wills Eye Institute, Philadelphia, PA, October 6, 2006.

2. "Resident Education in the Medical Marketplace: Case Presentation," Cross Campus Meeting, Columbia University, New York, NY, March 29, 2007.

3. "Inferior Retinectomy and Silicone Oil for Repair of Recurrent Retinal Detachments," Resident Night, New York Academy of Medicine, New York, NY, June 4, 2007.

4. "Non-Vascular Vision Loss n Pseudoxanthoma Elasticum," Atlantic Coast Retina Club, Philadelphia, PA, January 11, 2008.

5. "Central Visual Function 1 Year after Iodine-125 Brachytherapy for Ciliochoroidal Melanoma," Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 8, 2009.

6. "Ischemic Index in Ultra Wide Field Angiography is Predictive of Neovascular Complications in Central Retinal Vein Occlusion," Retina Congress, New York, NY, October 1, 2009.

7. "Macular Hold in Uveitis," Los Angeles Imaging Conference for Retina Specialists, Los Angeles, CA, November 17, 2009.

8. "Central Visual Field 2 Years after Iodine-125 Brachytherapy for Ciliochoroidal Melanoma," Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 6, 2010.

9. "Ultra Wide Field Fluorescein Angiography can Detect Macular Edema in Central Retinal Vein Occlusion," Research Day, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, May 16, 2010.

10. "Ultra Wide Field Fluorescein Angiography in Retinal Vascular Diseases," Department of Ophthalmology, University of Colorado, Denver, CO, November 24, 2010.

11. "Ultra Wide Field Fluorescein Angiography in Retinal Vascular Diseases," Department of Ophthalmology, Columbia University, New York, NY, December 9, 2010.

12. "Recent Innovations in Managing Diabetic Retinopathy, "Boston Asian-American Healthcare Conference, Boston, MA, February 13, 2011.

13. "Bevacizumab for Retinopathy of Prematurity Associated with Hypotony," Manhattan Ophthalmological Society, New York, NY, March 7, 2011.

14. "Vision Loss in Sickle Cell Disease," Los Angeles Imaging Conference for Retina Specialists, Los Angeles, CA, March 19, 2011.

15. "Retinopathy for Prematurity Update," Department of Pediatrics Rounds, Weiler Hospital, Bronx, NY, May 9, 2011.

16. "Limitations of Ultra Wide Field Fluorescein Angiography," Department of Ophthalmology Grand Rounds, Bronx Lebanon Hospital, Bronx, NY, August 16, 2011.

17. "Challenges of Validating New Technologies: Ultra Wide Field Fluorescein Angiography," American Academy of Ophthalmology, Orlando, FL, October 23, 2011.

18. "Challenges of Validating New Technologies: Ultra Wide Field Fluorescein Angiography," International Forum for Retinal Diseases, Guangzhou, China, November 13, 2011.

19. "Toddler with Recurrent Red Eye," Western Retina Study Club, San Francisco, CA, March 17, 2012.

20. "Ultra Wide Field Autofluorescence in Stargardt's Disease," International Retinal Imaging Symposium, Los Angeles, CA, February 26, 2013.

21. "Posterior Segment Complications after Cataract Surgery, Grand Rounds, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, April 3, 2013.

22. "Glaucoma after Retinopathy of Prematurity Laser," Pacific Retina Club, Los Angeles, CA, April 20, 2013.

23. "Update on Ultra Wide Field Imaging," Research Day, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, June 14, 2013.

24. "Update on Retinopathy of Prematurity," Research Day, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, June 15, 2013.

25. "Hand-Over-Hand Retrieval of a Corneal Lenticule," Women in Ophthalmology, Snowmass, CO, August 4, 2013.

26. "Update on Retinopathy of Prematurity," Department of Pediatrics NICU Rounds, UCLA Ronald Reagan Medical Center, Los Angeles, CA, August 27, 2013.

27. "Clinical Aspects of Bioengineering Challenges," Institute for Pure and Applied Mathematics, Los Angeles, CA, January 16, 2014.

28. "Advancements in Wide Field Retinal Imaging," Annual Optometry Symposium, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, January 26, 2014.

29. "Blurred Lines," Association of Pediatric Retina Surgeons, Cabo San Lucas, Mexico, February 13, 2014.

30. "Review of Medical Retina," OKAP Review Course, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, February 23, 2014.

31. "Which Anti-VEGF for Retinopathy of Prematurity?," Leonard Apt UCLA Meeting, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, April 1, 2014.

32. "Future of Retinopathy of Prematurity," Grand Rounds, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, April 23, 2014.

33. "Anti-VEGF for ROP: Is it the Standard of Care?" Pacific Coast Oto-Ophthalmologic Society Meeting, San Diego, CA, June 28, 2014.

34. "Advantages of 27g Vitrectomy." Alcon Surgical Forum, San Francisco, CA, November 15, 2014.

35. "Changing Perspectives on Retinopathy of Prematurity." Luminaires Juniors Quarterly Meeting. Santa Monica, CA, January 14, 2015.

30. "Review of Medical Retina," OKAP Review Course, Jules Stein Eye Institute, UCLA Geffen School of Medicine, Los Angeles, CA, February 21, 2015.

36. "Why Ultra-widefield Fluorescein Angiography." Doheny CME Imaging Conference. Los Angeles, CA, May 16, 2015.

37. "Healthcare Utilization of Anti-VEGF for Age-Related Macular Degeneration at the VAMC." Doheny Research Day, Los Angeles, CA, June 20, 2015.

Irena Tsui, M.D.

PUBLICATIONS/BIBLIOGRAPHY

RESEARCH PAPERS (PEER REVIEWED):

A. RESEARCH PAPERS – PEER REVIEWED:

1. Chen L, Wu W, Dentchev T, Zeng Y, Wang J, **Tsui I**, Tobias JW, Bennett J, Baldwin D, Dunaief JL: Light Damage Induced Changes in Mouse Retinal Gene Expression. Experimental Eye Research 2004 Aug; 79(2):239-47.

2. Rex TS, **Tsui I**, Hahn P, Maguire AM, Duan D, Bennett J, Dunaief JL: Adenovirus-Mediated Delivery of Catalase to Retinal Pigment Epithelial Cells Protects Neighboring Photoreceptors from Photo-oxidative Stress. Human Gene Therapy 2004 Oct; 15(10):960-7.

3. Vo DX, Lee OC, **Tsui I**, Zhao HQ, Siu P, Ginsburg K: Important Characteristics of Clinicians and Clinical Sites: The Voice of Immigrant Asian Youth. Journal of Adolescent Health 2005 Feb; 36(2):122.

4. **Tsui I**, Song B, Lin CS, Tsang SH: A Practical Approach to Retinal Dystrophies. Retinal Physician 2007(4):18-26.

5. **Tsui I**, Casper D, Chou CL, Tsang SH: Electronegative Electroretinogram Associated with Topiramate Use and Vitelliform Maculopathy. Documenta Ophthalmologica 2008 Jan; 116(1):57-60.

6. **Tsui I**, Fuchs B, Chou CL, Chang S, Tsang SH: Non-Vascular Vision Loss in Pseudoxanthoma Elasticum. Documenta Ophthalmologica 2008 Jul; 117(1):65-7.

7. Xining H, **Tsui I**, Tsang SH: Prognosticating Retinal Dystrophies in the Post-Genomic Era. Retina Today 2008 Jul-Aug; 44-49.

8. Tsang SH, **Tsui I**, Chou CL, Zernant J, Haamer E, Iranmanesh R, Tosi J, Allikmets R: A Novel Mutation and Phenotypes in Phosphodiesterase 6 Deficiency. American Journal of Ophthalmology 2008 Nov; 146(5):780-8.

9. **Tsui I**, Airiani S, Wen A, El-Sawy T, Fine HF, Maris PJ: Intravitreal Injection of Tissue Plasminogen Activator with a Pars Plana Glaucoma tube. Clinical Ophthalmology 2009; 3:91-3.

10. Jain A, Shah SP, **Tsui I**, McCannel TA: The Value of Optos Panoramic 200MA Imaging for the Monitoring of Large Suspicious Choroidal Lesions. Seminars in Ophthalmology 2009 Jan-Feb; 23(1):43-4.

11. Kaines A, **Tsui I**, Sarraf D, Schwartz SD: The Use of Ultra Wide Field Fluorescein Angiography in Evaluation and Management of Uveitis. Seminars in Ophthalmology 2009 Jan-Feb; 24(1):19-24.

12. **Tsui I**, Jain A, Shah S, Schwartz SD, McCannel TA: Wide Field Imaging of Peripheral Exudative Hemorrhagic Chorioretinopathy. Seminars in Ophthalmology 2009 Jan-Feb; 24(1):25-8.

13. **Tsui I**, Kaines A, Schwartz SD: Patterns of Periphlebitis in Intermediate Uveitis Using Ultra Wide Field Fluorescein Angiography. Seminars in Ophthalmology 2009 Jan-Feb; 24(1):29-33.

14. Shah SP, Jain A, **Tsui I**, McCannel TA: Optos Optomap Panaoramic 200MA Imaging of a Serous Choroidal Detachment Responsive to Furosemide. Seminars in Ophthalmology 2009 Jan-Feb; 24(1):40-2.

15. **Tsui I**, Chou CL, Palmer N, Lin CS, Tsang SH: Phenotype-Genotype Correlations in Autosomal Dominant Retinitis Pigmentosa Caused by RHO, D190N. Current Eye Research 2008 Nov; 33(11):1014-22.

16. **Tsui I**, Schubert HD: Retinotomy and Silicone Oil for Detachments Complicated by Anterior Inferior Proliferative Vitreoretinopathy. British Journal of Ophthalmology 2009 Sep; 93(9):1228-33.

17. Hubschman JP, Bourges JL, **Tsui I**, Reddy S, Yu F, Schwartz SD: Effect of Cutting Phases on Flow Rate in 20-, 23-, and 25-Guage Vitreous Cutters. Retina 2009 Oct; 29(9):1289-93.

18. **Tsui I**, Shamsa K, Perloff JK, Lee E, Wirthlin RS, Schwartz SD: Retinal Vascular Patterns in Adults with Cyanotic Congenital Heart Disease. Seminars in Ophthalmology 2009 Nov-Dec; 24(6):262-5.

19. **Tsui I**, Uslan DZ, Hubschman JP, Deng SX: Nocardia Farcinica Infection of a Baerveldt Implant in a Patient with a Poston Type I Keratoprosthesis. Journal of Glaucoma 2010 Jun-Jul; 19(5):339-40.

20. Shamsa K, Perloff JK, Lee E, Wirthlin RS, **Tsui I**, Schwartz SD: Retinal Vascular Patterns in Coarctation of the Aorta. American Journal of Cardiology 2010 Feb; 105(3):408-10.

21. **Tsui I**, Reddy S, Hubschman JP: An Elementary and Effective Method for Silicone Oil Removal. Retina 2010 Mar; 30(3):524-6.

22. Hu A, **Tsui I**, Hubschman JP: Pupillary Block Glaucoma after Pars Plana Vitrectomy with Air-Fluid Exchange in a Pseudophakic Air-Filled Eye. Ophthalmic Surgery, Lasers, and Imaging 2010 Mar; 9:1-3.

23. **Tsui I**, Schwartz SD, Hubschman JP: A Current Method to Collect an Undiluted Vitrectomy Sample. Retina 2010 May; 30(5):830-1.

24. **Tsui I**, Tsui IK, Auran JD, Fine HF, Maris PF Jr: Cerulean Fundus: An Unexpected Complication of Cataract Surgery in an Eye with Aqueous Misdirection. British Journal of Ophthalmology 2010 Aug; 94(8):1105-6.

25. Reddy S, Gorin MG, McCannel TA, **Tsui I**, Straatsma BR: Novel KRIT1/CCM1 Mutation in a Patient with Retinal Cavernous Hemangioma and Cerebral Cavernous Malformation. Graefes Archives for Clinical and Experimental Ophthalmology 2010 Sep; 248(9):1359-61.

26. Williams BK Jr, **Tsui I**, McCannel TA: Spectral-Domain Optical Coherence Tomography of Conjunctival Mucosa-Associated Lymphoid Tissue Lymphoma with Presumed Choroidal Involvement. Graefes Archives for Clinical and Experimental Ophthalmology 2010 Dec; 248(12):1837-40.

27. **Tsui I**, Campolattaro BN, Lopez R: Progression of Traumatic Lamellar Macular Hole to Full-Thickness Macular Hole and Retinal Detachment in a 3-Year Old Child. Retina Cases Brief Rep. 2010 Winter;4(1):25-7

28. **Tsui I**, Kaines A, Havunjian M, Hubschman S, Heilweil G, Prasad PS, Oliver SC, Yu F, Bitrian E, Hubschman JP, Friberg T, Schwartz SD: Ischemic Index and Neovascularization in Central Retinal Vein Occlusion. Retina 2011 Jan; 31(1):105-10.

29. Devin F, **Tsui I**, Morin B, Dupra JP, Hubschman JP: T-Shaped Scleral Buckle for Macular Detachments in High Myopes. Retina 2011 Jan; 31(1):177-80.

30. Chiang A, Reddy S, **Tsui I**, Hubschman JP: Vitreous Web after Pars Plana Vitrectomy and Bevacizumab with Fluid-Air Exchange. Seminars in Ophthalmology 2011 Jan; 26(1):25-7.

31. Huang L, Levinson D, Mian U, **Tsui I**: Optical Coherence Tomography Characteristics of Idiopathic Macular Holes. Journal of Ophthalmology 2012 Jul 18 [Epub].

32. **Tsui I**, Franco-Cardenas V, Hubschman JP, Yu F, Schwartz SD: Ultra Wide Field Fluorescein Angiography can Detect Macular Pathology in Central Retinal Vein Occlusion. Ophthalmic Surgery, Lasers, and Imaging 2012 May-Jun; 43(3):257-62.

33. **Tsui I**: Perfluorocarbon-Assisted Clear Corneal Phacoemulsification. Retina 2012 Nov-Dec; 32(10):2165-6.

34. Yu L, **Tsui I**, Hubschman JP: Macular Hole Associated with Sarcoidosis. Retina Cases Brief Rep. 2012 Fall; 6(4):412-4.

35. **Tsui I**, Ebani E, Rosenberg JB, Lin J, Angert RM, Mian U: Patent Ductus Arteriosus and Indomethacin Treatment as Independent Risk Factors for Plus Disease in Retinopathy of Prematurity. Journal of Pediatric Ophthalmology and Strabismus 2013 Mar-Apr; 50(2):88-92.

36. **Tsui I**, Franco-Cardenas V, Hubschman JP, Schwartz SD: Pediatric Retinal Conditions Imaged by Ultra Wide Field Fluorescein Angiography. Ophthalmic Surgery, Lasers, and Imaging Retina 2013 Jan-Feb; 44(1):59-67.

37. Roybal CN, **Tsui I**, Sanfilippo C, Hubschman JP: Scleral Electrocautery and its Effects on Choroid Vessels: Implications for Subretinal Fluid Drainage during Scleral Buckling Surgery. Ophthalmic Surgery, Lasers, and Imaging Retina 2013 Mar-Apr; 44(2):176-80.

38. **Tsui I**, Bajwa A, Franco-Cardenas V, Pan CK, Kim HY, Schwartz SD: Peripheral Fluorescein Angiographic Findings in Fellow Eyes of Patients with Branch Retinal Vein Occlusion. International Journal of Inflammation 2013 Mar 31 [Epub].

39. **Tsui I**, Sarraf D: Paracentral Acute Middle Maculopathy and Acute Macular Neuroretinopathy. Ophthalmic Surgery, Lasers, and Imaging Retina. 2013 Nov-Dec; 44(6 Suppl):S33-5.

40. **Tsui I**, Voleti VB, Giaconi JA, Dumars S, Hosseini H, John VJ, Berrocal AM: Diagnostic and Therapeutic Challenges. Retina 2013 Apr 29. Retina 2013 Nov-Dec; 33(10): 2177-9.

41. Wells JA, Aldave AJ, **Tsui I**: Surgical Technique: Hand-Over-Hand Retrieval of a Posteriorly Dislocated DSAEK Graft in an Eye with an Iris Reconstruction Lens. Ophthalmic Surgery, Lasers, and Imaging Retina. 2013 Nov 1; 44(6): 569-71

42. **Tsui I**, Ebani E, Rosenberg JP, Angert RM, Lin J, Mian U: Trends in Retinopathy of Prematurity Over a 5-year Period in a Racially Diverse Population. Ophthalmic Surgery, Lasers, and Imaging Retina. 2014 Mar-Apr; 45(2): 138-42

43. **Tsui I**, Drexler A, Stanton AL, Kageyama J, Ngo E, Straatsma BR. Pilot Study Using Mobile Health to Coordinate the Diabetic Patient, Diabetologist, and Ophthalmologist. J Diabetes Sci Technol. 2014 Jul; 8(4): 845-9

44. Lin W, Pan CK, **Tsui I**: Spontaneous Resolution of Clinically Apparent Submacular Fluid after Scleral Buckling Surgery. Ophthalmic Surgery, Lasers, and Imaging Retina. 2014 Sep-Oct; 45(5): 474-7

45. Quan AV, Pineles SL, **Tsui I**, Velez FG: Phthisis Bulbi After Lensectomy in Retinopathy of Prematurity Eyes Previously Treated with Laser Photocoagulation. Retinal Cases Brief Rep. 2015 Winter; 9(1): 67-71

46. Franco-Cardenas V, Roseberg J, Ramirez A, Lin J, **Tsui I**: Decadelong Profile of Women in Ophthalmic Publications. JAMA Ophthalmol. 2015 Mar: 133(3): 255-9

47. Wong RK, Hubschman S, **Tsui I**: Reactivation of Retinopathy of Prematurity after Ranibizumab Treatment. Retina. 2015 Apr; 35(4): 675-80

48. Quan AV, Moore GH, Tsui I: Retinal Vein-to-Vein Anastomoses in Sturge-Weber Syndrome Documented by Ultra-Widefield Fluorescein Angiography. J AAPOS. 2015 Jun;19(3):270-2

49. Tsui I, Williams BK Jr, Kok YO, Heilweil G, Schwartz SD: Reliability of Ischemic Index Grading in Common Retinal Vascular Diseases. Ophthalmic Surg Lasers Imaging Retina. 2015 Jun;46(6):618-25

50. Tsui I, Beardsley RM, McCannel TA, Oliver SC, Chun MW, Lee SP, Chow PE, Agazaryan N, Yu F, Straatsma BR: Visual Acuity, Contrast Sensitivity and Color Vision Three Years After Iodine-125 Brachytherapy for Choroidal and Ciliary Body Melanoma. Open Ophthalmol J. 2015 Jun 26;9:131-5

51. Goodwin DM, Casey R, Tsui I: Capsular Block Syndrome Following Combined Cataract and Vitrectomy Surgery in a Patient with Intraocular Gas. Ophthalmic Surg Lasers Imaging Retina. 2015 Oct 1;46(9):980-2

52. Sanfilippo CJ, Klufas MA, Sarraf D, Tsui I: Optical Coherence Tomography Angiography of Sickle Cell Maculopathy. Retin Cases Brief Rep. 2015 Fall;9(4):360-2

53. Nemiroff J, Kuehlewein L, Rahimy E, Tsui I, Doshi R, Gaudric A, Gorin MB, Sadda S, Sarraf D: Assessing Deep Retinal Capillary Ischemia in Paracentral Acute Middle Maculopathy by Optical Coherence Tomography Angiography. Am J Ophthalmol. 2015 Nov 9. Pii:S0002-9394(15)00683-2

54. Wong RK, Tsui I: Reply. Retina. 2015 Dec;35(12):e76-7

55. Papour A, Taylor Z, Stafsudd O, Tsui I, Grunfest W: Imaging Autofluorescence Temporal Signatures of the Human Ocular Fundus in Vivo. J Biomed Opt. 2015 Nov 1;20(11):110505

56. Friedlander AH, Giaconi, JA, Tsui I, Aghazadehsanai, N, Chang TI, Garrett NR: Meaningful Correlation Between Asymptomatic Retinal Arteriole Emboli and Calcified Plaque Found on Panoramic Dental Imaging of Males with Diabetes. Oral Surg Oral Med Oral Pathol Oral Radiol. 2016 Apr;121(4):434-40.

57. Tsui I, Havunjian MA, Davis JA, Giaconi JA: Snapshot of Teleretinal Screening for Diabetic Retinopathy at the West Los Angeles Medical Center. Telemed J E Health. 2016 Mar 17.

2. **Tsui I,** Rosenberg JB, Franco-Cardenas V. Women in Print – Reply. JAMA Ophthalmology 2015 March 12.

REVIEWS:

1. Huang JH, **Tsui I**, Judkins AR, Simon E, Birknes JK, Sutton LN: Intramedullary Cervical Spinal Cord Germinoma. Neurosurgery 2004 Dec; 55(6):1432.

2. Belenitsky MP, Liu C, **Tsui I**: Scedosporium Apiospermum Endophthalmitis Treated Early with Intravitreous Voriconazole Results in Recovery of Vision. Journal of Ophthalmic Inflammation and Injection 2012 Feb 28.

3. **Tsui I**: Scleral Buckle Removal: Indications and Outcomes. Survey of Ophthalmology 2012 May-Jun; 57(3):253-63.

4. **Tsui I**, Pan CK, Rahimy E, Schwartz SD: Ocriplasmin for Vitreoretinal Diseases. Journal of Biomedicine and Biotechnology 2012 Oct 14 [Epub].

5. Diep TM, **Tsui I**: Risk Factors Associated with Diabetic Macular Edema. Diabetes Research and Clinical Practice 2013 Jun; 100(3):298-305.

POSTERS:

1. **Tsui I**, Dunn M: How Well Can Staff Predict the Subjective Health of Patients and Spinal Cord Injury? American Association of Spinal Cord Injury Psychologists and Social Workers, Las Vegas, NV, August 2000.

2. **Tsui I**, Rex T, Maguire A, Bennett J, Dunaief JL: Adenovirus-Mediated Delivery of Catalase Protects the Mouse Retina *in vivo* and RPE cells *in vitro* from Oxidative Stress Induced Cell Death. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 1, 2004.

3. **Tsui I**, Smalley GW, Evans G: Jamaica Eye Mission: From Friendship 1979 to Vision 2020. Unite For Sight, Boston, MA, April 2, 2005.

4. **Tsui I**, Engelbert M, Airiani S, Braunstein R: In-Depth Analysis of Resident Ophthalmology Call at an Urban, Tertiary Care Hospital. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 1, 2006.

5. **Tsui I**, Schubert HD: Inferior Retinectomy and Silicone Oil for Repair of Recurrent Retinal Detachments. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 10, 2007.

6. **Tsui I**, Flynn JT: Slippery Slope of Genetic Testing. Notre Dame Medical Ethics Conference, South Bend, IN, March 15, 2008.

58. Cao JH, Wagner BD, Cerda A, McCourt EA, Palestine A, Enzenauer RW, Braverman RS, Wong, RK, Tsui I, Gore C, Robbins SL, Puente MA Jr, Kauffman L, Kong L, Morrison DG, Lynch AM: Colorado Retinopathy of Prematurity Model: a Multi-Institutional Validation Study. J AAPOS. 2016 May 7.

B. RESEARCH PAPERS – PEER REVIEWED (IN PRESS):

C. RESEARCH PAPERS – NON-PEER REVIEWED:

1. **Tsui I**, Dunn M: How Well can Staff Predict the Subjective Health of Patients with Spinal Cord Injury? Psychosocial Process 2000 Winter; 3(4):192-3.

CHAPTERS:

1. **Tsui I**, Tsirbas A, Mango CW, Schwartz SD, Hubschman JP: Surgery in Ophthalmology. Robot Surgery. Intech, 2009 Jan; 149-64.

2. **Tsui I**, Tsang SH: Fundus Autofluorescence in X-liked Retinoschisis. Fundus Autofluorescence. Eds: Noemi Lois, John V. Forrester. Lippincott, Williams, and Wilkins, 2009 Jul: 167-74.

3. (**Tsui I**: Translation) Coscas G: Optical Coherence Tomography in Age-Related Macular Degeneration. Springer, May 2010.

4. **Tsui I**, Schwartz SD: Wide Angle Fluorescein Angiography in Infants and Children. Pediatric Retina, 2nd Edition. Ed: Mary Elizabeth Hartnett. Lippincott, Williams, and Wilkins, 2014:131-37.

5. **Tsui I**, Prasad P: Central Retinal Vein Occlusions. Atlas of Wide-Field Retinal Angiography and Imaging. Ed. Igor Kozak and J. Fernando Arevalo, Springer, 2015

LETTERS TO THE EDITOR:

1. Minnal VR, **Tsui I**, Rosenberg JB: Central Macular Splaying and Outer Retinal Thinning in Asymptomatic Sickle Cell Patients by Spectral-Domain Optical Coherence Tomography. American Journal of Ophthalmology 2011 Dec; 152(6):1074.

7. **Tsui I**, Kane S: New Surgical Technique: 25-Gauge Vitrectomy and Primary Lens Implantation for the Management of Pediatric Cataracts. American Society of Cataract and Refractive Surgery, Chicago, IL, April 5, 2008.

8. **Tsui I**, Tosi J, Zernant J, Haamer E, Chou C, Corcostegui I, Tsang S, Allikmets R: Novel Mutation and Phenotypes in Phosphieserase 6 Deficiency. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, April 11, 2008.

9. Kaines A, **Tsui I**, Sarraf D, Schwartz SD: Utility of Ultra Wide Field Fluorescein Angiography in the Evaluation and Management of Uveitis. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, April 11, 2009.

10. Hubschman JP, Tingting J, **Tsui I**, Schwartz SD, Eldredge J: Computational Fluid Dynamics Evaluation of Vitreous Flow during Vitrectomy. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, April 11, 2010.

11. Prasad PS, **Tsui I**, Heilweil G, Hubschman JP, Schwartz SD: Ischemic Index for the Quantification of Retinal Non-Perfusion in Branch Retinal Vein Occlusion. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, April 11, 2010.

12. **Tsui I**, Schwartz SD: Ultra Wide Field Fluorescein Angiography can Detect Macular Pathology in Central Retinal Vein Occlusion. American Society of Retina Specialists, Vancouver, Canada, August 2010.

13. Ramirez AM, Heilweil G, Schwartz SD, Hubschman JP, **Tsui I**: Increased Ischemic Index Correlates with Neovascularization in Diabetic Retinopathy. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 1, 2011.

14. Franco-Cardenas V, **Tsui I**, Heilweil G, Schwartz SD: Ultra Wide Field Fluorescein Angiography Accurately Evaluates Macular Pathology in Diabetic Retinopathy. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 2, 2011.

15. Herzlich A, **Tsui I**, Gritz DC: Epidemiology of Uveitis in the Bronx. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 4, 2011.

16. Cheema A, Minnal VR, **Tsui I**: The Utility of Ultra Wide Field Imaging in a Spontaneous and Progressive Submacular Hemorrhage due to Hereditary Prothrombin Deficiency. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 6, 2012.

17. Kim H, Franco-Cardenas V, Pan CK, Heilweil G, **Tsui I**, Hubschman JP, Schwartz SD: Ultra Wide Field Angiographic Characteristics of Fellow Eyes in

Branch Retinal Vein Occlusion. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 7, 2012.

18. Pan CK, Franco-Cardenas V, Heilweil G, **Tsui I**, Hubschman JP, Schwartz SD: Ultra Wide Field Angiography Characteristics of Central Retinal Vein Occlusion. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 7, 2012.

19. Sandler S, Schwartz SD, Mian U, **Tsui I**: Prospective Study Comparing Ultra Wide Field versus Conventional Imaging for the Detection and Management of Diabetic Retinopathy. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 8, 2012.

20. Nguyen MK, Mozayan A, Minnal V, Rosenberg J, **Tsui I**: Peripheral Retinal Pruning in Systemic Lupus Erythematosus. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 9, 2012.

21. Hosseini H, Rivera D, Heilweil G, Hubschman JP, **Tsui I**, Schwartz SD: Enhanced Depth Optical Coherence Tomography Imaging of the Optic Canal in Central Retinal Vein Occlusion. Association for Research in Vision and Ophthalmology, Seattle, WA, May 6, 2013.

22. Heilweil G, **Tsui I**, Hosseini H, Schwartz SD: Autofluorescence in Stargardt Macular Dystrophy. Association for Research in Vision and Ophthalmology, Seattle, WA, May 7, 2013.

23. **Tsui I**, Straatsma BR: Use of a Mobile Internet Application to Increase Communication among the Diabetic Patient, Diabetologist, and Ophthalmologist. World Ophthalmology Congress, Tokyo, Japan, April 2, 2014.

24. **Tsui I**, Straatsma BR: Pilot Study using Mobile Health to Coordinate the Diabetic Patient, Diabetologist, and Ophthalmologist. Association for Research in Vision and Ophthalmology, Orlando, FL, May 8, 2014.

25. Wong RK, **Tsui I**: Anti-Vascular Endothelial Growth Factor (VEGF) for Retinopathy of Prematurity: Jules Stein Eye institute Experience. Association for Research in Vision and Ophthalmology, Orlando, FL, May 8, 2014.

26. Chen J, Schwartz SD, Sarraf DS, **Tsui I**: Healthcare Utilization of Anti-VEGF for Age-Related Macular Degeneration at the Veterans Affairs Medical Center. Association for Research in Vision and Ophthalmology, Denver, CO, May 4, 2015.

MISCELLANEOUS:

Irena Tsui, M.D.

1. Medical student teaching: biannually since 2012.
2. Resident retina lectures: biannually since 2012.