



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:

Provider Name:

- 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



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 PAID

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 and topical outline of the subject matter. Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title <u>STAR WARS: ROBOTS ONE</u> <u>Retina One: A story of Systemic Discovery</u>	Course Presentation Date <u>7:45 AM - 11:35 AM</u> 12/18/2016
---	---

Course Provider Contact Information

Provider Name <u>Coastal Vision Medical Group</u>
<u>Gina</u> (First) <u>Valdemar</u> (Last) _____ (Middle)

Provider Mailing Address

Street 943 S. Main St. #100 City Orange State CA Zip 92880

Provider Email Address gina.valdemar@coastal-vision.com

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		
<u>Raj</u> (First)	<u>Rathod</u> (Last)	_____ (Middle)
License Number <u>A 120894</u>	License Type <u>M.D.</u>	
Phone Number <u>(714) 746 0679</u>	Email Address _____	

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.

[Signature]
Signature of Course Provider

11/5/16
Date



IN A TIME OF CELEBRATION, A GROUP OF UNLIKELY HEROES BAND TOGETHER ON A MISSION TO LEARN MORE ABOUT OPTOMETRY, THEIR CHOSEN WEAPON.



WHEN:
 Sunday, December 18th
 Registration opens at 6:45am
 7:45am-11:35am (4-hour CE
 followed by the movie)

WHERE:
 AMC Downtown Disney
 Downtown Disney District
 1565 Disneyland Drive
 Anaheim, CA 92802

Hyperdrive of Toys

Bring any new, unwrapped toy, to benefit Toys for Tots, and receive a movie ticket for you and a guest for Rogue One: A Star Wars Story. Movie to follow CE. Additional tickets available for purchase.



Downtown Disney Parking: First 2 hours are free; additional 2 hours free with AMC validation (Disneyland parking lots may be available for all day parking prices; parking is responsibility of attendee)

For registration information please visit our Affiliate Portal:
coastalvisionmedical.com/site/ces.htm

AGENDA

- 6:45 am Check-in (pastries and coffee provided)
- 7:45 am Welcome - Opening Remarks
- 7:50 am Lisa Garbutt, MD Symphony and Symfony Toric: The Best of Both Galaxies
- 8:15 am Jennifer Wu, MD Corneal Crosslinking "The Lightsaber for Corneal Ectasia"
- 8:40 am Raj Rathod, MD Retina One: A Story of Systemic Discovery
- 9:05 am Dan Tran, MD Combining Laser Corneal Refractive Surgery and Intraocular Lens Technology - The Force Is Strong
- 9:30 am Break
- 9:55 am Vincent Hau, MD Retina Jeopardy...From a Galaxy, Far, Far Away
- 10:20 am Betsy Nguyen, MD MIGS Episode III: Cypass Micro-Stent, A New Hope
- 10:45 am Madhu Agarwal, MD Eye Rebel: Waging War on Orbital Disease
- Dan Tran, MD
- 11:10 am Lisa Garbutt, MD Rogue Diagnosis: Case Presentations
- Betsy Nguyen, MD
- Jennifer Wu, MD
- 11:35 am Conclusion
- 11:45 am Movie: *Rogue One: A Star Wars Story*

*CE and movie ticket registration is based on first-come, first-served basis. Seating is limited.



November 5, 2016

State Board of Optometry
2450 Del Paso Road, Ste. 105
Sacramento, CA 95834

RE: Late submission of CE course approval; Star Wars: Go Rogue Symposium-Symfony and Symfony Toric; The Best of Both Galaxies, Corneal Crosslinking "The Lightsaber for Corneal Ectasia", Retina One: A Story of Systemic Discovery, Combining Laser Refractive Surgery and Intraocular Lens Technology-The force is strong, Retina Jeopardy, MIGS Episode III: Cypass Micro-Stent, A New Hope, Eye Rebel: Waging War on Orbital Disease, Rogue Diagnosis: Case Presentations.

Dear Practice and Education committee,

I am writing this letter in regards to late submission for the multi-course symposium titled "Star Wars; Go Rogue" scheduled for presentation on 12/18/16. We are just shy of the 45 day submission request, and wanted to include a letter for late submission with our CE approval application.

We continue to work diligently to get all required items to the board needed for CE approval in a timely manner. Due to multiple speakers at the upcoming CE, we had difficulty obtaining all the lectures to meet the submission requirement timeline and would appreciate your consideration of our continuing education approval request.

Please feel free to reach out to us with any other questions. We look forward to continued relations with the State Board of Optometry and the practice and education committee.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gina Valdemar', is written over a horizontal line.

Gina Valdemar
Affiliate Relations and Education Director
Coastal Vision Medical Group
ginavaldemar@coastal-vision.com

Coastal Vision Irvine
15825 Laguna Canyon Rd., Ste. 201, Irvine, CA 92618
Tel: (949) 453-4661 • Fax: (949) 453-4663

Coastal Vision Orange
293 S. Main St., Ste. 100, Orange, CA 92868
Tel: (714) 771-1213 • Fax: (714) 771-7126

Coastal Vision Long Beach
709 E. Anaheim St., Long Beach, CA 90813
Tel: (562) 591-7700 • Fax: (562) 591-1311

Star Wars: Go Rogue 4 hour CE

Course Title: Retina One: A Story of Systemic Discovery

Course Presentation date: 12/18/2016

Speaker: Raj Rathod, MD

Target Audience: This lecture is intended for optometrist seeking continuing education

Course Description:

This lecture seeks to provide optometrists with information regarding a detailed examination of the retina. Using a case based approach; discussion will include the importance of obtaining a thorough history and performing a detailed examination of the retina. The cases will elucidate how systemic diseases were discovered from retinal findings.

CE Credit: .50 CE Units

1 **Retina One: A Story of Systemic Discovery**

Raj Rathod, MD, MBA
December 18, 2016
Coastal Vision CE Event

2 **Introduction**

- A number of systemic medications are capable of impacting retinal function, even when employed at therapeutic dosages
-
- This presentation will review
 - Specific medications
 - Classifications and impact of effects on the retina
 - Mechanisms of toxicity when known
 - Means of limiting risks
 - Treatment when applicable

3 **Types of Toxicity**

- Macular edema
- Choroidal toxicity / Retinal folds
- RPE disruption
- Crystalline Retinopathy
- Vascular Damage
- Miscellaneous
-

4 **Macular and Retinal Edema**

- Prostaglandin Analogues (Latanoprost, Travoprost, Bimatoprost)
- Nicotinic Acid (Niacin)
- Glitazones (Actos and Avandia)
- Fingolimod
- Oral contraceptives (from RVO)
- Paclitaxel (Taxol) and Docetaxel
- Chemotherapeutic Agents
- Epinephrine

5 **Prostaglandin Analogues**






- Well-known ocular anti-hypertensives
- More common in setting of recent surgery or ocular inflammation









6 **Niacin (Niaspan)**

- Used to treat hyperlipidemia
- Macular edema without leakage on angiography
- Usually with doses greater than 3 gm / day
- Resolves with discontinuation of therapy

7 **Glitazones / Thiazolidinediones**

- Actos and Avandia
 - Used to decrease insulin resistance in DM type 2
- Diabetics may develop macular edema regardless

- 8  **Fingolimid (Gilenya)**
- Used to treat multiple sclerosis
 - Fingolimid-associated macular edema (FAME)
- 9  **Paclitaxel (Taxol) / Docetaxel (Taxotere)**
- Approved in the treatment of metastatic breast and ovarian carcinoma, and in Kaposi's sarcoma
 - Cystic maculopathy without leakage on fluorescein angiography
 - Reversible with cessation of the medication
- 10  **Choroidal Toxicity**
- Topiramate
 - Sulfa-containing medications
 - Metronidazole
 - Diuretics (Hydroxychlorothiazide, Triamterene, Acetazolamide)
 - Other antibiotics
- 11  **Topiramate (Topamax)**
- Anticonvulsant
 - Seizures
 - Bipolar disorder
 - Migraine prophylaxis
 - Choroidal effusion
 - Blurred vision = induced myopia
 - Headache/eye pain = acute angle closure glaucoma
 - Treatment
 - Discontinue medication
 - IOP lowering agents
 - Cycloplegics
- 12  **RPE Disruption**
- Phenothiazines (Thioridazine, Chlorpromazine)
 - Dideoxyinosine (DDI)
 - Clofazamine
 - Deferoxamine
 - Chloroquine derivatives (Chloroquine, Hydroxychloroquine)
 - Corticosteroid preparations
 - Chemotherapeutic Agents (Cisplatin and BCNU/carmustine, Denileuken diftitox)
 - Quinine sulfate
- 13  **Thioridazine (Mellaril)**
- Introduced in 1952 for the treatment of psychoses
 - Retinal pigmentary retinopathy reported in 1960
 - Symptoms
 - Visual blurring
 - Brownish discoloration of vision
 - Central or ring-shaped scotoma
- 14 

- 15  **Deferoxamine**
- Iron-chelating agent used to treat conditions with excessive serum iron levels
 - Hemochromatosis
 - Thalassemia
 - Aluminum toxicity
 - Ocular signs of toxicity include vision loss, scotomas, dyschromatopsia, and nyctalopia
 - ? Removal of copper from RPE
- 16  **Progressive Retinopathy from Deferoxamine**
- 17  **Dideoxyinosine (DDI/Didanosine)**
- Mid-peripheral pigmentary changes noted in patients with AIDs receiving high dose therapy
 - Associated ERG and EOG changes
 - Retinal toxicity stabilized after discontinuation of the drug
- 18 
- 19  **Corticosteroids**
- Inadvertent injection into eye
 - Toxicity from vehicle, rather than steroid itself
 - Extensive neovrosis and pigmentary degeneration
 - Immediate removal indicated
- 20  **Hydroxychloroquine (Plaquenil) / Chloroquine**
- Traditional antimalarial agents
 - Used in the treatment of autoimmune diseases, including rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE)
 - Bind melanin and to concentrate in the iris, ciliary body and retinal pigment epithelium,
- 21  **Toxicity**
- Toxicity first described in 1967
 - Chloroquine toxicity described in 1959
 - Toxicity seen in cornea and retina
 - Cornea verticillata
 - Affects a small portion of patients
 - No treatment exists
 - Objective changes precede visual symptoms
- 22  **Screening**
- Original task force set guidelines in 2002
 - Dose at or below 6.5mg/kg/day
 -
 - Incidence of toxicity may be higher than thought
 - Close to 1% if treated 5-7 years
 - Cumulative dose more predictive than daily dose
 - Risk increases substantially after total 1000g
 - Dosing should be based on *ideal* body weight
 - Toxicity still occurs in those thought to be on "safe" dose

- Newer diagnostic modalities are available
-
-

23  **Current Guidelines**

2011 Guidelines

- Baseline examination
- No additional risk factors = Annual screening
- Other risk factors = more frequent
 - Small stature
 - Liver or kidney disease
 - Coexisting macular disease
 - Advanced age
- Ensure dosing is based on ideal body weight
- Ancillary Testing

24 

25 

26  **OPHTHALMOLOGY – January 2015**

Pericentral retinopathy and racial differences in hydroxychloroquine toxicity.

-
- Hydroxychloroquine retinopathy does not always develop in a parafoveal (bull's eye) pattern, and a pericentral pattern of damage is especially prevalent among Asian patients. Screening practices may need to be adjusted to recognize pericentral and parafoveal hydroxychloroquine retinopathy.
-

- Melles, Marmour

27  **Fundus + IVFA**

28  **Fundus + IVFA**

29  **OCT**

30  **Microperimetry**

31  **Multifocal ERG**

32  **ERG**

33  **FAF**

34  **Crystalline Retinopathy**

- Tamoxifen
- Methoxyflurane
- Nitrofurantoin
- Canthaxanthine
- Talc
- Chemotherapeutic Agents

35  **Tamoxifen**

- Selective estrogen receptor modulator used in the management of breast cancer
- Patients may be asymptomatic at onset but may complain of decreased vision and dyschromatopsia
- Crystal deposits and macular edema
- Current therapeutic dosing levels are generally less than those shown to cause crystal deposition
 - Annual exams are still recommended
- Crystals persist despite cessation of medication

36 37 38  **Canthaxanthine**

- Vitamin A derivative used in the treatment of psoriasis and eczema
- Previously used as an oral tanning agent
- Primarily asymptomatic
 - diagnosis of toxicity based on both clinical exam and a history of ingestion
- Doughnut-shaped ring of golden intraretinal deposits surrounds the fovea
- With drug cessation, the retinal crystals may take years to disappear, while patients often remain asymptomatic

39 40  **Talc**

- Indicates a history of intravenous drug abuse
- Inert filler used in oral powdered medications
- Deposits range from 5 to 10 μm in size and are visualized as refractile yellow opacities in the macula
- Ischemic sequelae include peripheral retinal or optic disk neovascularization, vitreous hemorrhage and arteriovenous anastomosis.

41  **Talc Retinopathy**42 43  **Methoxyflurane (Penthrane)**

- Non-flammable anesthetic agent
- May cause a form of secondary hyperoxalosis
 - Renal failure
 - Crystals deposit at the level of the RPE and inner retina
 - May resemble a flecked retina syndrome with diffuse retinal involvement

44  **Vascular Damage**

- Quinine sulfate
- Ergot alkaloids
- Oral contraceptives
- Aminoglycosides (intravitreal)
- Interferon
- Chemotherapeutic Agents Cisplatin and BCNU (Carmustine)
- Procainamide

- Gemcitadine

45  **Quinine Sulfate**

- Previously used as anti-malarial and as a muscle relaxant
- Non-approved indications include abortifacient, street drug adulterant, and as a suicidal agent
- Symptoms of include blurred visual acuity, visual field loss, nyctalopia and photophobia
- Transient blindness may occur though rarely is permanent
- Initial ocular findings are subtle though as vision recovers disc pallor and retinal vessel attenuation become apparent
- Treatment ranges from prompt hemodialysis to use of vasodilating agents

46  **Quinine Toxicity**

47  **Oral Contraceptives**

- Systemic thromboembolic disease well described
- Retinal findings
 - arteriolar occlusion
 - central retinal vein occlusion
 - retinal hemorrhages
 - macular edema
- Most reports from 70's -> estrogen levels higher
- Transient disturbances in color vision
- Patients with pre-existing systemic or retinal vascular disease should not be placed on oral contraceptives
-

48  **Gentamicin**

- Macular infarction following intravitreal injection

49  **Interferon**

- Used to treat
 - chronic hepatitis B and C infection
 - renal cell carcinoma
 - Leukemia
 - Lymphoma
 - AIDS-related Kaposi's sarcoma
 - malignant melanoma
 - Hemangiomas
- Characterized by cotton wool spots and retinal hemorrhages in a peripapillary distribution
 - Resolve spontaneously or disappear when the drug is discontinued
- Most patients are asymptomatic
- Branch retinal artery and vein occlusion, central retinal vein with or without branch retinal artery occlusion, CME, and optic disc edema have all been associated with interferon therapy and can cause irreversible vision loss

50  **Interferon Retinopathy**

51  **Miscellaneous**

- Digoxin
- Methanol
- Sildenafil
-

52  **Digoxin (Lanoxin)**

- Cardiac glycoside used in the treatment of atrial fibrillation, atrial flutter and congestive heart failure.
- Symptoms range from decreased vision to photopsias, xanthopsia and scotomas.
- Fundus examination unremarkable
- ERG studies may show prolonged b-waves reflecting bipolar and Müller cell dysfunction
- When digoxin is stopped, both the visual symptoms and prolonged ERG b-wave will resolve

53 54  **Methanol**

- Commonly found in antifreeze, solvents, and certain fuels
- Occasionally consumed by alcoholics
- 12- to 24-hour asymptomatic latent period
- Symptoms include photophobia, blurred vision, visual field deficits, and vision loss
- Broken down by the enzyme alcohol dehydrogenase, producing the formic acid
 - directly toxic to the inner retina and optic nerve
- Examination reveals edema of the optic disc and retina, which can later progress to optic atrophy
- Prompt treatment with fomepizole, ethanol, and/or hemodialysis

55  **Sildenafil (Viagra)**


- Anti-impotence drug
- Selective inhibitor of phosphodiesterase-5 (PDE5)
- May modify the transduction cascade in the photoreceptor outer segments
- Symptoms may include cyanopsia, photophobia and blurred vision, 1-2 hours after ingestion
 - Visual acuity is unchanged
 - No fundoscopic changes on exam
 - Transient ERG changes
 - Symptoms resolve over four to six hours after medication ingestion
- Less common reports
 - Non-arteritic anterior ischemic optic neuropathy (NAION)
 - Central serous chorioretinopathy (CSR), and serous macular detachment

56 57  **Questions?**

Thank you


Retina One: A Story of Systemic Discovery

Raj Rathod, MD, MBA
December 18, 2016
Coastal Vision CE Event



Introduction

- A number of systemic medications are capable of impacting retinal function, even when employed at therapeutic dosages
- This presentation will review
 - Specific medications
 - Classifications and impact of effects on the retina
 - Mechanisms of toxicity when known
 - Means of limiting risks
 - Treatment when applicable




Types of Toxicity

- Macular edema
- Choroidal toxicity / Retinal folds
- RPE disruption
- Crystalline Retinopathy
- Vascular Damage
- Miscellaneous



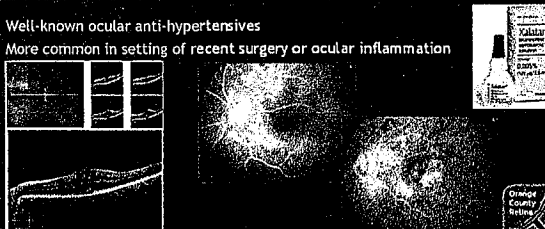

Macular and Retinal Edema

- Prostaglandin Analogues (Latanoprost, Travoprost, Bimatoprost)
- Nicotinic Acid (Niacin)
- Glitazones (Actos and Avandia)
- Fingolimod
- Oral contraceptives (from RVO)
- Paclitaxel (Taxol) and Docetaxel
- Chemotherapeutic Agents
- Epinephrine





Prostaglandin Analogues

- Well-known ocular anti-hypertensives
- More common in setting of recent surgery or ocular inflammation

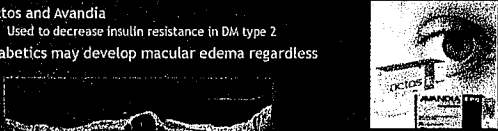

Niacin (Niaspan)

- Used to treat hyperlipidemia
- Macular edema without leakage on angiography
- Usually with doses greater than 3 gm / day
- Resolves with discontinuation of therapy



Glitazones / Thiazolidinediones

- Actos and Avandia
 - Used to decrease insulin resistance in DM type 2
- Diabetics may develop macular edema regardless

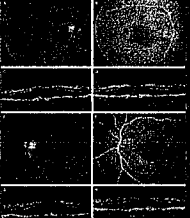

Fingolimod (Gilenya)

- Used to treat multiple sclerosis
- Fingolimod-associated macular edema (FAME)


Paclitaxel (Taxol) / Docetaxel (Taxotere)

- Approved in the treatment of metastatic breast and ovarian carcinoma, and in Kaposi's sarcoma
- Cystic maculopathy without leakage on fluorescein angiography
- Reversible with cessation of the medication

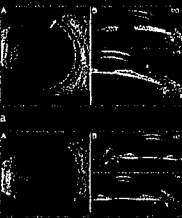

Choroidal Toxicity

- Topiramate
- Sulfa-containing medications
 - Metronidazole
 - Diuretics (Hydroxychlorothiazide, Triamterene, Acetazolamide)
 - Other antibiotics




Topiramate (Topamax)

- Anticonvulsant
 - Seizures
 - Bipolar disorder
 - Migraine prophylaxis
- Choroidal effusion
 - Blurred vision = induced myopia
 - Headache/eye pain = acute angle closure glaucoma
- Treatment
 - Discontinue medication
 - IOP lowering agents
 - Cycloplegics


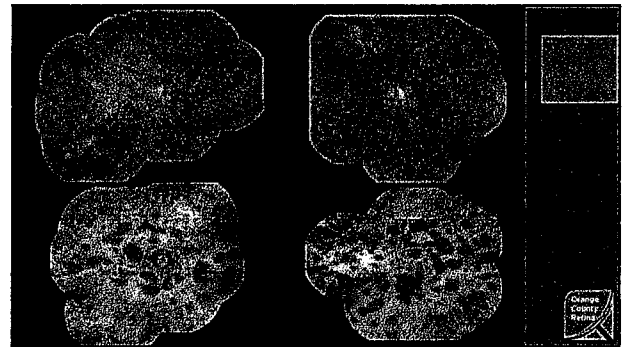
RPE Disruption

- Phenothiazines (Thioridazine, Chlorpromazine)
- Dideoxyinosine (DDI)
- Clofazimine
- Deferoxamine
- Chloroquine derivatives (Chloroquine, Hydroxychloroquine)
- Corticosteroid preparations
- Chemotherapeutic Agents (Cisplatin and BCNU/carmustine, Denileukin difitox)
- Quinine sulfate




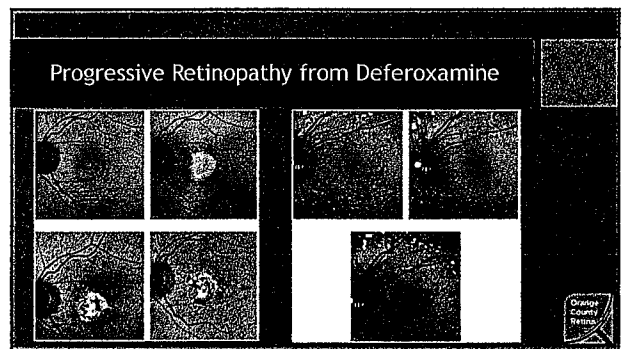
Thioridazine (Mellaril)

- Introduced in 1952 for the treatment of psychoses
- Retinal pigmentary retinopathy reported in 1960
- Symptoms
 - Visual blurring
 - Brownish discoloration of vision
 - Central or ring-shaped scotoma


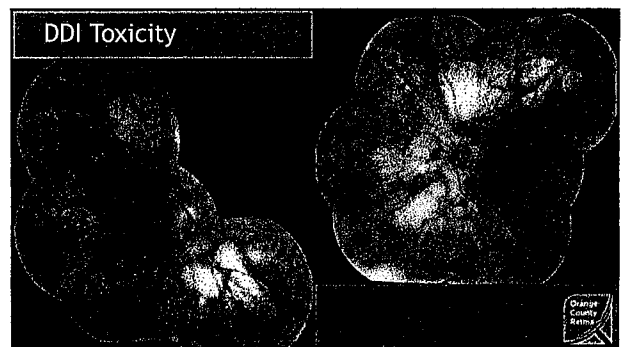
Deferoxamine

- Iron-chelating agent used to treat conditions with excessive serum iron levels
 - Hemochromatosis
 - Thalassemia
 - Aluminum toxicity
- Ocular signs of toxicity include vision loss, scotomas, dyschromatopsia, and nyctalopia
- Removal of copper from RPE

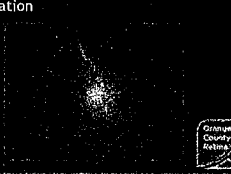

Dideoxyinosine (DDI/Didanosine)

- Mid-peripheral pigmentary changes noted in patients with AIDs receiving high dose therapy
- Associated ERG and EOG changes
- Retinal toxicity stabilized after discontinuation of the drug


Corticosteroids

- Inadvertent injection into eye
- Toxicity from vehicle, rather than steroid itself
- Extensive neovrosis and pigmentary degeneration
- Immediate removal indicated


Hydroxychloroquine (Plaquenil) / Chloroquine

- Traditional antimalarial agents
- Used in the treatment of autoimmune diseases, including rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE)
- Bind melanin and to concentrate in the iris, ciliary body and retinal pigment epithelium,




Toxicity

- Toxicity first described in 1967
 - Chloroquine toxicity described in 1959
- Toxicity seen in cornea and retina
 - Cornea verticillata
- Affects a small portion of patients
- No treatment exists
- Objective changes precede visual symptoms



Screening


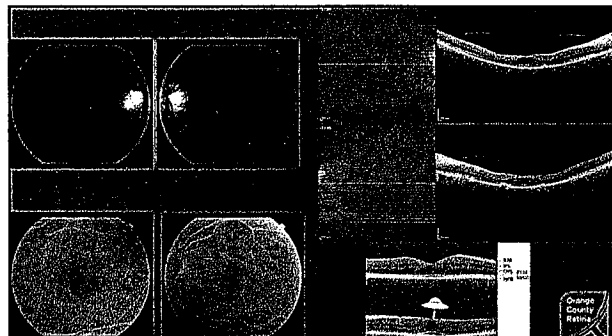

- Original task force set guidelines in 2002
 - Dose at or below 6.5mg/kg/day
- Incidence of toxicity may be higher than thought
 - Close to 1% if treated 5-7 years
- Cumulative dose more predictive than daily dose
 - Risk increases substantially after total 1000g
 - Dosing should be based on *ideal* body weight
- Toxicity still occurs in those thought to be on "safe" dose
- Newer diagnostic modalities are available

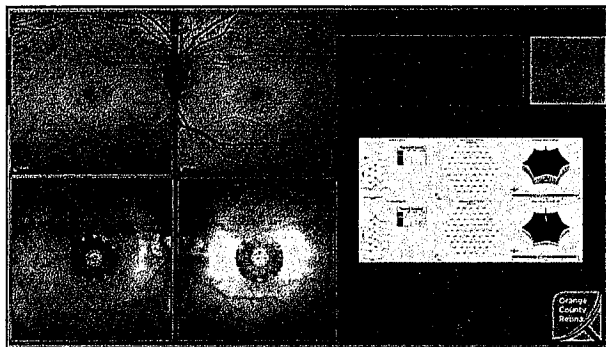


Current Guidelines

2011 Guidelines

- Baseline examination
- No additional risk factors = Annual screening
- Other risk factors = more frequent
 - Small stature
 - Liver or kidney disease
 - Coexisting macular disease
 - Advanced age
- Ensure dosing is based on ideal body weight
- Ancillary Testing

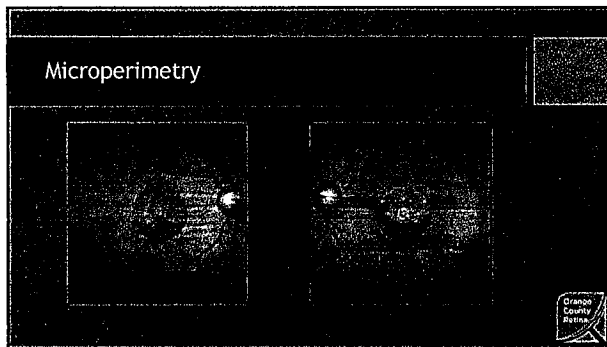
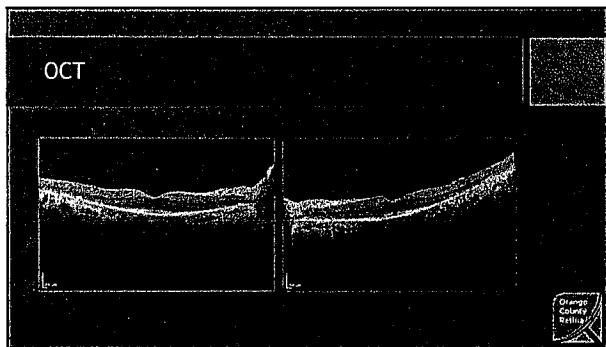
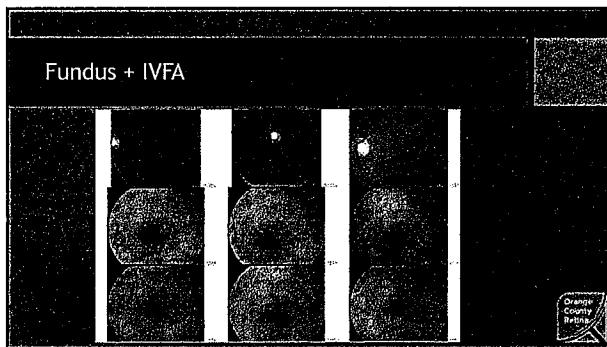
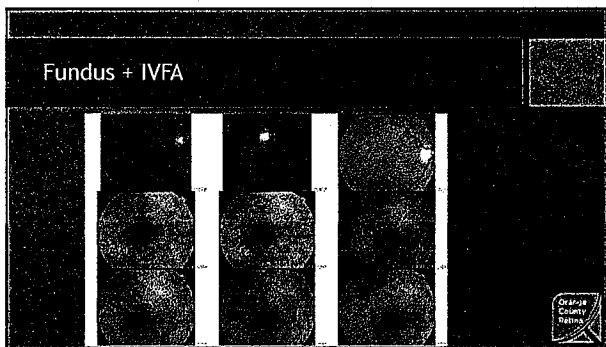



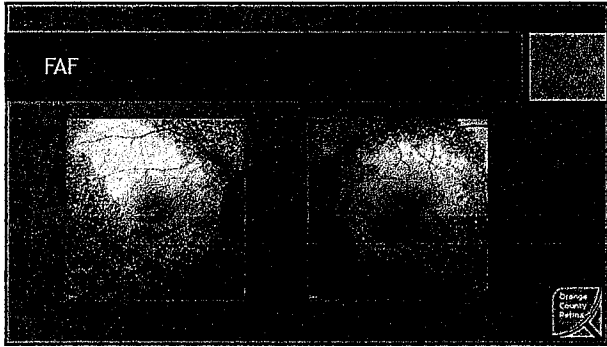
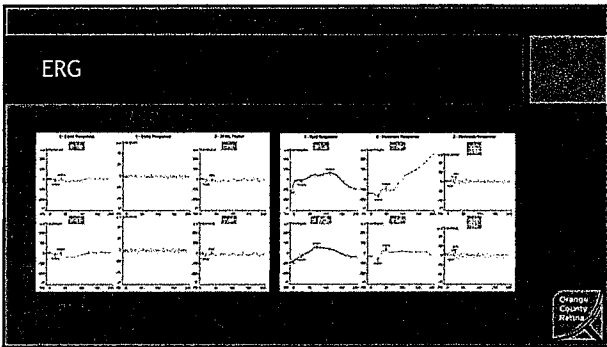
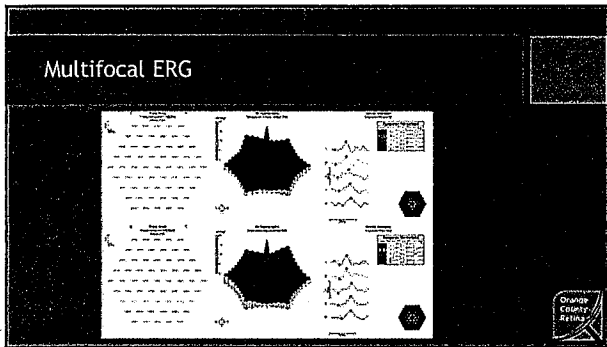
Ophthalmology January 2015

Pericentral retinopathy and racial differences in hydroxychloroquine toxicity.

- Hydroxychloroquine retinopathy does not always develop in a parafoveal (bull's eye) pattern, and a pericentral pattern of damage is especially prevalent among Asian patients. Screening practices may need to be adjusted to recognize pericentral and parafoveal hydroxychloroquine retinopathy.

• Melles, Mamour





Crystalline Retinopathy

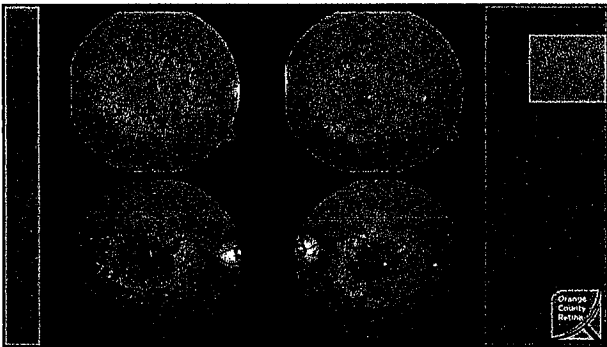
- Tamoxifen
- Methoxyflurane
- Nitrofurantoin
- Canthaxanthine
- Talc
- Chemotherapeutic Agents

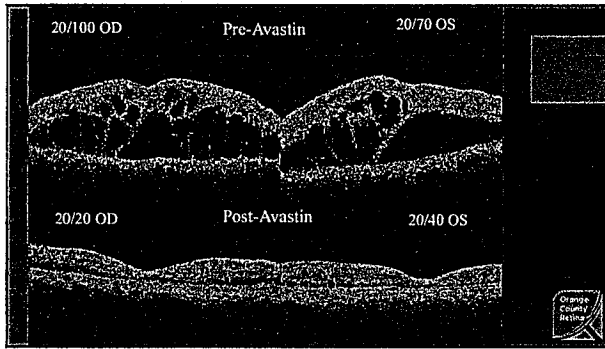
Orange County Retina

Tamoxifen

- Selective estrogen receptor modulator used in the management of breast cancer
- Patients may be asymptomatic at onset but may complain of decreased vision and dyschromatopsia
- Crystal deposits and macular edema
- Current therapeutic dosing levels are generally less than those shown to cause crystal deposition
 - Annual exams are still recommended
- Crystals persist despite cessation of medication

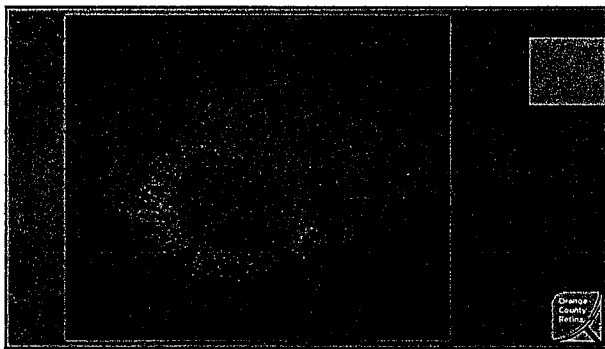
Orange County Retina





Canthaxanthine

- Vitamin A derivative used in the treatment of psoriasis and eczema
- Previously used as an oral tanning agent
- Primarily asymptomatic
 - diagnosis of toxicity based on both clinical exam and a history of ingestion
- Doughnut-shaped ring of golden intraretinal deposits surrounds the fovea
- With drug cessation, the retinal crystals may take years to disappear, while patients often remain asymptomatic





Talc

- Indicates a history of intravenous drug abuse
- Inert filler used in oral powdered medications
- Deposits range from 5 to 10 μm in size and are visualized as refractile yellow opacities in the macula
- Ischemic sequelae include peripheral retinal or optic disk neovascularization, vitreous hemorrhage and arteriovenous anastomosis.

Talc Retinopathy


Methoxyflurane (Penthrane)

- Non-flammable anesthetic agent
- May cause a form of secondary hyperoxalosis
 - Renal failure
 - Crystals deposit at the level of the RPE and inner retina
 - May resemble a flecked retina syndrome with diffuse retinal involvement.


Vascular Damage

- Quinine sulfate
- Ergot alkaloids
- Oral contraceptives
- Aminoglycosides (intravitreal)
- Interferon
- Chemotherapeutic Agents Cisplatin and BCNU (Carmustine)
- Procainamide
- Gemcitadine

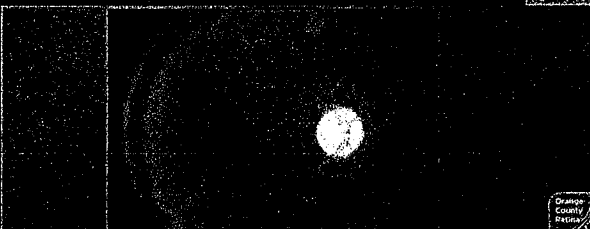



Quinine Sulfate

- Previously used as anti-malarial and as a muscle relaxant
- Non-approved indications include abortifacient, street drug adulterant, and as a suicidal agent
- Symptoms of include blurred visual acuity, visual field loss, nyctopia and photophobia
- Transient blindness may occur though rarely is permanent
- Initial ocular findings are subtle though as vision recovers disc pallor and retinal vessel attenuation become apparent
- Treatment ranges from prompt hemodialysis to use of vasodilating agents




Quinine Toxicity

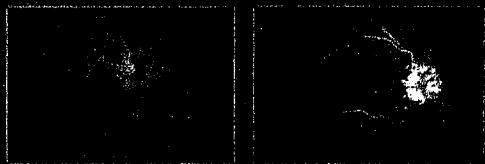

Oral Contraceptives

- Systemic thromboembolic disease well described
- Retinal findings
 - arteriolar occlusion
 - central retinal vein occlusion
 - retinal hemorrhages
 - macular edema.
- Most reports from 70's -> estrogen levels higher
- Transient disturbances in color vision
- Patients with pre-existing systemic or retinal vascular disease should not be placed on oral contraceptives




Gentamicin

- Macular infarction following intravitreal injection

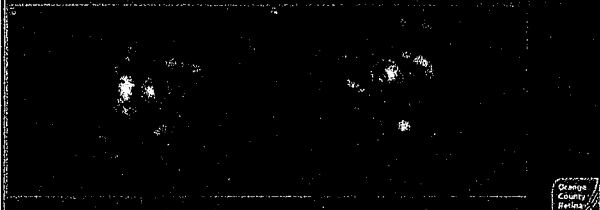




Interferon

- Used to treat
 - chronic hepatitis B and C infection
 - renal cell carcinoma
 - leishmania
 - Lymphoma
 - HLA-related Kaposi's sarcoma
 - malignant melanoma
 - Hemangiomas
- Characterized by cotton wool spots and retinal hemorrhages in a peripapillary distribution
 - resolves spontaneously or disappears when the drug is discontinued
- Most patients are asymptomatic
- Branch retinal artery and vein occlusion, central retinal vein with or without branch retinal artery occlusion, CME, and optic disc edema have all been associated with interferon therapy and can cause irreversible vision loss




Interferon Retinopathy




Miscellaneous

- Digoxin
- Methanol
- Sildenafil



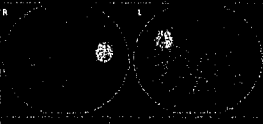

Digoxin (Lanoxin)

- Cardiac glycoside used in the treatment of atrial fibrillation, atrial flutter and congestive heart failure.
- Symptoms range from decreased vision to photopsias, xanthopsia and scotomas.
- Fundus examination unremarkable
- ERG studies may show prolonged b-waves reflecting bipolar and Müller cell dysfunction
- When digoxin is stopped, both the visual symptoms and prolonged ERG b-wave will resolve


Methanol

- Commonly found in antifreeze, solvents, and certain fuels
- Occasionally consumed by alcoholics
- 12- to 24-hour asymptomatic latent period
- Symptoms include photophobia, blurred vision, visual field deficits, and vision loss
- Broken down by the enzyme alcohol dehydrogenase, producing the formic acid
 - directly toxic to the inner retina and optic nerve
- Examination reveals edema of the optic disc and retina, which can later progress to optic atrophy
- Prompt treatment with fomepizole, ethanol, and/or hemodialysis




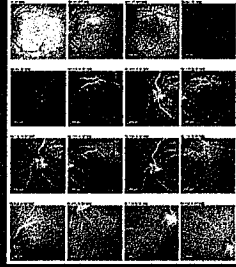



Sildenafil (Viagra)

- Anti-impotence drug
- Selective inhibitor of phosphodiesterase-5 (PDE5)
- May modify the transduction cascade in the photoreceptor outer segments
- Symptoms may include cyanopsia, photophobia and blurred vision, 1-2 hours after ingestion
 - Visual acuity is unchanged
 - No fundoscopic changes on exam
 - Transient ERG changes
 - Symptoms resolve over four to six hours after medication ingestion
- Less common reports
 - Non-arteritic anterior ischemic optic neuropathy (NAION)
 - Central serous choroidopathy (CSR), and serous macular detachment




NAION from Sildenafil



Questions?

Thank you



CURRICULUM VITAE

RAJIV R. RATHOD, M.D., M.B.A.
Fellow, American Academy of Ophthalmology

Office Address:
Orange County Retina Medical Group
1200 North Tustin Avenue, Suite 140
Santa Ana, California 92705
714-972-8432

PROFESSIONAL PRACTICE AFFILIATIONS

Orange County Retina Medical Group
Orange County, California
Physician/Surgeon
Since July 2012

Locations

1200 North Tustin Avenue	Suite 140	Santa Ana, CA 92705	714-972-8432
1200 North Tustin Avenue	Suite 100	Santa Ana, CA 92705	714-972-8432
23521 Paseo de Valencia	Suite 309	Laguna Hills, CA 92653	949-581-3618
320 Superior Avenue	Suite 160	Newport Beach, CA 92663	949-646-3242
333 W. Bastanchury Road	Suite 200	Fullerton, CA 92835	714-451-0801
31451 Rancho Viejo Road	Suite 101	San Juan Capistrano, CA 92675	949-496-0611

EDUCATION AND TRAINING

Vitreo-Retinal Fellowship

University of Illinois
Chicago, Illinois; 2010-2012

Residency

Chief Resident, Ophthalmology
Washington University School of Medicine
St. Louis, Missouri; 2009-2010

Ophthalmology

Washington University School of Medicine / Barnes-Jewish Hospital
St. Louis, Missouri; 2006-2009

Internship in Medicine

Santa Clara Valley Medical Center Transitional Internship
Stanford University School of Medicine
San Jose, California; 2005-2006

Medical School

Medical Doctorate
Vanderbilt University School of Medicine
Nashville, Tennessee; 2000-2005

Graduate

Master of Business Administration
Owen Graduate School of Management
Vanderbilt University
Nashville, Tennessee; 2003-2005

Undergraduate

Bachelor of Science, Biological Sciences
Stanford University
Stanford, California; 1995-1999

BOARD CERTIFICATION

American Board of Ophthalmology, Diplomate 2012
United States Medical Licensing Examination, Diplomate 2006

MEDICAL LICENSURE

California, issued 2012
Illinois, through 7/31/14
Missouri, through 1/31/11

HONORS

- 2011 Fellow of the Year Award, University of Illinois at Chicago
- 2010 "Golden Apple" Best Teacher Award, Washington University
- 2009 Mat Guirgis Pediatric Ophthalmology & Strabismus Award: Outstanding Resident, Washington University
- 2009 Ron Burde Award (dedication to teaching and patient care), Washington University
- 2008 CareerPhysician Chief Resident Program Competition Winner
- 2005 Beta Gamma Sigma, Vanderbilt Chapter
- 2004 Tulane Business Plan Competition, Second Place
- 2001 Microbes and Defense Society, Vanderbilt University
- 2001 Top Spear Award (top student in physiology course), Vanderbilt University

PROFESSIONAL ORGANIZATIONS

American Academy of Ophthalmology
American Medical Association
Chicago Ophthalmological Society
Missouri Society of Eye Physicians and Surgeons
St. Louis Ophthalmological Society

HOSPITAL/SURGERY CENTER AFFILIATIONS

2012 – Present	Anaheim Regional Medical Center, Anaheim, California
2012 – Present	Barranca Surgery Center, Irvine, California
2012 – Present	Children's Hospital of Orange County, Orange, California
2012 – Present	Children's Hospital at Mission, Mission Viejo, California
2012 – Present	Hoag Memorial Hospital Presbyterian, Newport Beach, California
2012 – Present	Pacific Hills Surgery Center, Laguna Hills, California
2012 – Present	St. Joseph Hospital, Orange, California
2012 – Present	St. Jude Medical Center, Fullerton, California
2012 – Present	Western Medical Center, Santa Ana, California

CLINICAL RESEARCH

Six years of experience, prior to July 2012, in conducting research in ophthalmology-related topics including endophthalmitis, vitreoretinal surgery, retinal detachment repair, and sickle cell retinopathy.

01. Lpath, Protocol LT1009-Oph-003 (NEXUS), Phase IIA, 2012-Present
Sub-Investigator. *A multicenter, masked, randomized, comparator-controlled study evaluation Isonep™ (sonepcizumab [LT1009]) as either monotherapy or adjunctive therapy to Lucentis or Avastin versus Lucentis or Avastin alone for the treatment of subjects with choroidal neovascularization secondary to AMD.*
02. Alimera Sciences, Protocol C-01-11-008, Extension Study, 2012-Present
Sub-Investigator. *An open-label, multicenter, extension study of the safety and utility of the new inserter of Iluvien® (Fluocinolone Acetonide Intravitreal Insert) 0.19mg and the safety of Iluvien® in subjects with DME.*
03. EyeGate Pharmaceuticals, Protocol EGP-437-004, Phase III, 2012-2013
Sub-Investigator. *A prospective, multi-center, randomized, double-masked, positive controlled, clinical trial designed to evaluate the safety and efficacy of iontophoretic dexamethasone phosphate ophthalmic suspension (1%) in patients with non-infectious anterior segment uveitis*
04. Quark Pharmaceuticals, Protocol QRK202 (MATISSE), Phase II, 2012-Present
Sub-Investigator. *An open-label dose escalation study of PF-04523655 (Stratum I) combined with a prospective, randomized, double-masked, multi-center, controlled study (Stratum II) evaluating the efficacy and safety of PF-04523655 alone and in combination with ranibizumab versus ranibizumab alone in diabetic macular edema*
05. Xoma, Protocol X052130/CL3-78989-005, Phase III, 2012-Present
Sub-Investigator. *A randomized, double-masked, placebo-controlled study of the safety and efficacy of gevokizumab in the treatment of active non-infectious intermediate, posterior, or pan-uveitis*
06. Pfizer, Protocol B1181003-1050, Phase II, 2012-Present
Sub-Investigator. *A phase 2, multi-center, randomized, double-masked, placebo-controlled, multi-dose study to investigate the efficacy, safety, pharmacokinetics and pharmacodynamics of RN6G (PF-04382923) in subjects with geographic atrophy secondary to age-related macular degeneration*
07. Xoma, Protocol X052131/CL3-78989-005 (EYEGUARD™ -C), Phase III, 2012-Present
Sub-Investigator. *A randomized, double-masked, placebo-controlled study of the safety and efficacy of gevokizumab in the treatment of subjects with non-infectious intermediate, posterior, or pan- uveitis currently controlled with systemic treatment*

08. Regeneron Protocol VGFTe-AMD-1124 ((RE-VIEW), Phase IV, 2012-Present
Sub-Investigator. *Rigorous evaluation of vision and safety with intravitreal aflibercept injection dosed every 8 weeks over 2 years in neovascular AMD*
09. Merck Protocol MK8931—017 (SCH 900931, P07738), Phase 2/3, Collaborative Study, 2012-Present
Ophthalmology Investigator. *A randomized, placebo controlled, parallel-group, double blind efficacy and safety trial of MK-8931 in subjects with mild to moderate Alzheimer's disease*

BIBLIOGRAPHY

ARTICLES

01. **Rathod RR**, Mieler WF. An update on the management of intraocular foreign bodies. *Retinal Physician*; April 2011.

PUBLISHED ABSTRACTS/POSTER PRESENTATIONS

01. **Rathod RR**, Shen DJ, Wang MX. Relationship between stromal ablation depth and hyperopic shift after 6 mm phototherapeutic keratectomy using VISX Star Excimer Laser. *Investigative Ophthalmology and Visual Science* 2002;43:E-Abstract 159.
02. **Rathod RR**, Wang MX, Cohen I. Effects of posterior corneal refractive power change on LASIK; June 2002. American Society of Cataract and Refractive Surgery
03. **Rathod RR**, Khanifar A, Kammer JA. Incidence of glaucoma after repeat penetrating keratoplasty. *Investigative Ophthalmology and Visual Science* 2005;46: E-Abstract 130.
04. **Rathod RR**, Apte RS, Blinder KJ. Safety and outcomes of 25-gauge transconjunctival vitreoretinal surgery. *Investigative Ophthalmology and Visual Science* 2008;49: E-Abstract 6002.
05. **Rathod RR**, Rao PK. Incidence of intraocular infection in the setting of systemic fungal infection. *Investigative Ophthalmology and Visual Science* 2009;50: E-Abstract 3554.
06. **Rathod RR**, Lim JI. Outcomes of retinal detachment repair with relaxing retinectomies in cases of severe proliferative vitreoretinopathy. *Investigative Ophthalmology and Visual Science* 2011;52: E-Abstract 6170.
07. **Rathod RR**, Lim JI. The utility of relaxing retinectomies in repair of recurrent retinal detachments with severe proliferative vitreoretinopathy. Presented as poster at American Society of Retina Specialists Meeting; August 2011.

PRESENTATIONS

01. The role of submacular surgery in the treatment of choroidal neovascular membranes in POHS. Washington University Department of Ophthalmology and Visual Sciences, Grand Rounds; January 31, 2007
02. Posterior reversible encephalopathy syndrome. Washington University Department of Ophthalmology and Visual Sciences, Grand Rounds; February 21, 2007.
03. Functional visual loss. Washington University Department of Ophthalmology and Visual Sciences, Grand Rounds; March 27, 2007.

04. Iontopheretic Dexamethasone Phosphate Ophthalmic Suspension in Patients with Non-Infectious Anterior Segment Uveitis: Phase I/II Data. Anaheim, California; October 3, 2012

COMMUNITY INVOLVEMENT

Mobile Eye Care Clinic for the Homeless, Illumination Foundation, Sadelback Memorial Care Hospital, San Clemente, CA; November 4, 2012

LANGUAGES

Medical Spanish, Gujarati