

Rule These Out Before You Diagnose it as Dry Eye

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ARS Polling Instructions

Step 1 - Open the Vision East app and log in using your badge ID and last name

Step 2 - Head to the Connect & Learn tab and tap on All Education Sessions

Step 3 - Select the course you are attending from the list of sessions

Step 4 - Scroll to the bottom and select "Pre-course questions" prior to the session or "Post-course questions" after the session

Step 5 - Complete the survey question and Submit!

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Disclosures

- I have received honoraria in the past 2 years for speaking, writing, participating in an advisory capacity, research or meeting support from: Apellis, ABB Optical, Alcon Laboratories, Allergan, Art Optical, Bausch + Lomb Health, Contamac, CooperVision, CSEye, Horizon Therapeutics, Johnson & Johnson Vision Care, Kala, Lenstech, Notal Vision, Novartis, Optovue, Oyster Point, RVL, Sun Pharma, Tarsus, Tangible Science, Santen, Visus, Walman Optical and Zea Vision.
- All relevant relationships have been mitigated

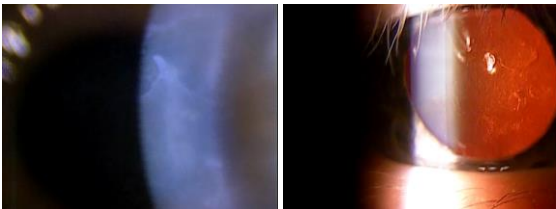
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Epithelial Basement Membrane Dystrophy

- Also referred to as map-dot-fingerprint, Cogan's microcystic dystrophy, or anterior basement membrane dystrophy
- Questions of true dystrophy versus degeneration
- Risk factors: family history (although difficult to track from patient history), ocular injuries (abrasions), ocular surgeries
- Basement membrane extend, abnormally, into the corneal epithelium
- This irregularity increases risk of recurrent corneal erosion (RCE), reduced vision, fluctuating vision

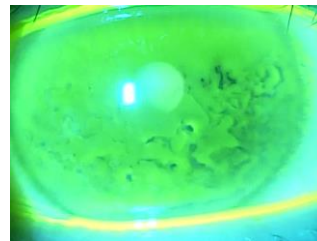
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Epithelial Basement Membrane Dystrophy



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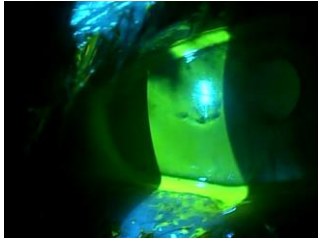
Epithelial Basement Membrane Dystrophy



- Negative staining
- Needs to be differentiated from TBUT
- vision can be different on a day to day basis because of variation in corneal irregularities

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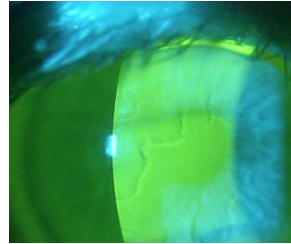
Epithelial Basement Membrane Dystrophy



-Increased risk of RCE
-Symptoms of eye discomfort can complicate diagnosis

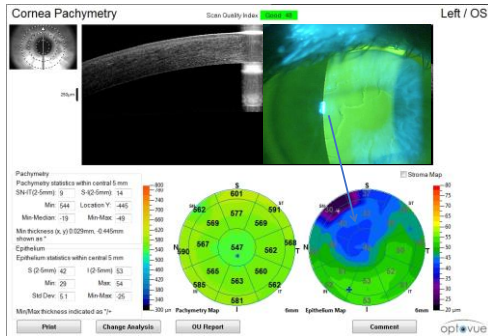
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Epithelial Basement Membrane Dystrophy



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EBMD



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Epithelial Basement Membrane Dystrophy

- Lubrication
- Consider punctal occlusion
- Ointment in the evening (consider hyperosmotic agents)
- Contact lenses (bandage and to improve vision quality)
- Amniotic membrane (consider for RCE)
- Oral doxycycline (consider for RCE)
- Scleral lenses
- Corneal debridement
- Phototherapeutic keratectomy (PTK)

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Floppy Eyelid Syndrome



- Extensive lid laxity secondary to decreased elastin content in tarsal plate
- Spontaneous eversion of the lid can occur while sleeping
- Can lead to chronic irritation of the lid
- Critical to perform lid eversion on eye examination

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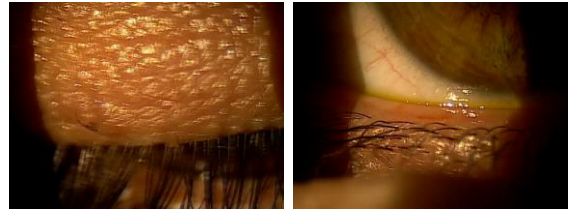
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Floppy Eyelid Syndrome

- Low elastin levels and spontaneous eversion
- Will cause signs/symptoms of ocular discomfort
- Has a strong association obstructive sleep apnea
- Also associated with keratoconus, down syndrome

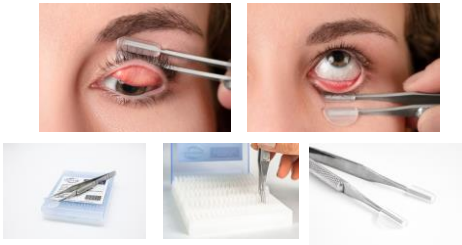
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Floppy Eyelid Syndrome



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Meivert



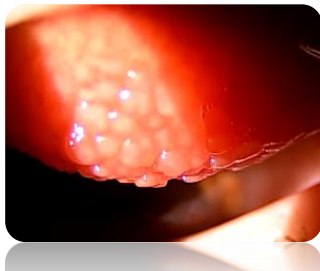
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Lid Wiper Epitheliopathy



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GPC



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Floppy Eyelid Syndrome

- Question about sleep patterns
- Question about sleep apnea or confirm diagnosis
- Refer to physician for appropriate testing
- Monitor optic nerves carefully for risk of glaucoma

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Floppy Eyelid Syndrome

- Ointment in the evening
- Sleep rite
- Eye mask in the evening
- Blepharoplasty
- Lacriserts
- Punctal occlusion

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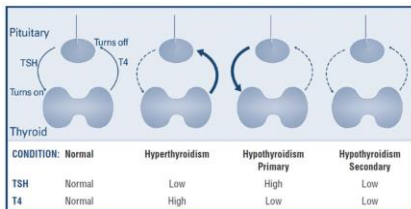
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Thyroid Function

- TSH is produced by pituitary gland
- Thyroid Gland Produces T4 which is converted to T3
- Alterations in hormonal balance can cause problems to arise

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Thyroid Gland Function

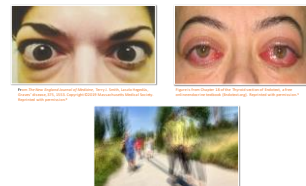


<https://www.thyroid.org/thyroid-function-tests/>

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TED Is a Debilitating, Progressive, and Vision-threatening Autoimmune Disease

- Patients may experience^{1,2}:
 - Poor **ophthalmic** clinical outcomes
 - Disfigurement
 - Vision-threatening complications
 - Psychosocial distress
 - Restrictions in daily activities and ability to work



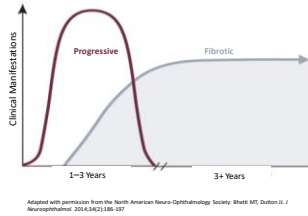
1. Bormanis J, et al. The Ophthalmology. 2003;110:1015-1018. 2. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 3. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 4. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 5. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 6. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 7. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 8. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 9. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018. 10. Bormanis J, et al. Ophthalmology. 2003;110:1015-1018.

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Inflammation During Progressive TED Advances to Chronic Fibrosis¹

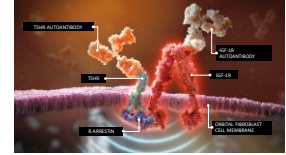
- Progressive (active), inflammatory phase of TED can last up to 3 years^{1,2}
- Patients eventually progress to the fibrotic (inactive) phase of TED, which is characterized by irreversible fibrosis³
- Fibrosis begins during the progressive (active) phase and leads to the lasting sequelae associated with permanent disfigurement and functional visual impairment^{1,3}



1. Shattuck MI et al. Neuroophthalmol. 2016;36(2):180-187. 2. Barish Barak J, et al. Ophthalmol. 2011;119(12):2493-2501. 3. Barish Barak J, et al. Clin Ophthalmol. 2009;3:543-551.

TED is Driven by Autoantibody Activation of IGF-1R

- Orbital fibroblasts, which are specialized cells responsible for tissue repair, are central to the pathophysiology of TED^{1,2}
- IGF-1R, a gatekeeper of orbital fibroblast activation, is overexpressed in TED orbital fibroblasts⁴
- IGF-1R and TSHR form a receptor-signaling complex and colocalize in orbital fibroblasts⁴
- Activation of IGF-1R stimulates release of inflammatory cytokines and production of hyaluronan and adipogenesis^{1,4,5}



1. Barish Barak J, et al. Ophthalmol. 2011;119(12):2493-2501. 2. Barish Barak J, et al. Neuroophthalmol. 2016;36(2):180-187. 3. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718. 4. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718. 5. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718.

Inflammation, Tissue Expansion, and Eye Muscle Changes May Lead to the Clinical Manifestations of TED

Healthy Eye and Orbital Tissue¹

- Eye is well protected by eyelid
- Thin periorbital muscles
- Orbit contains a small amount of tissue and fat

In the Presence of TED²

- Eye lid retraction
- Eye protrusion
- Inflammation of lacrimal caruncle
- Eye lid and conjunctival retraction

Activation of the IGF-1R/TSHR signaling complex on orbital fibroblasts triggers an inflammatory response, leading to tissue expansion and remodeling in the orbit^{1,3}

1. Barish Barak J, et al. Ophthalmol. 2011;119(12):2493-2501. 2. Barish Barak J, et al. Neuroophthalmol. 2016;36(2):180-187. 3. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718.

Recognizing the Signs and Symptoms of TED

Eyelid^{1,3}

- Upper eyelid retraction: 91% of patients affected
- Eyelid swelling
- Pain
- Lagophthalmos (incomplete closure of eyelid)

Orbital Tissue^{1,3,4}

- Exophthalmos (proptosis): Occurs in 62% of patients
- Pain/deep ache
- Disfigurement

1. Barish Barak J, et al. Ophthalmol. 2011;119(12):2493-2501. 2. Barish Barak J, et al. Neuroophthalmol. 2016;36(2):180-187. 3. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718. 4. Barish Barak J, et al. JAMA Ophthalmol. 2013;31(12):1711-1718.

Ongoing Inflammation and Expansion of Orbital Tissues Leads to Changes in Physical Appearance

Conjunctiva and Cornea^{1,3}

- Chemosis (swelling of the conjunctiva)
- Conjunctival hyperemia (redness)
- Photophobia (light sensitivity)
- Pain
- Foreign body sensation (grittiness)
- Exposure keratopathy
- Swollen lacrimal caruncle
- Dry eye and tearing

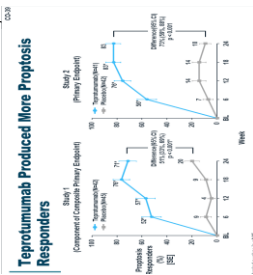
Extraocular Muscle^{1,5}

- Restricted ocular motility: Occurs in ~40% of patients
- Diplopia (double vision)
- Pain
- Retro-orbital ache
- Decreased vision and depth perception

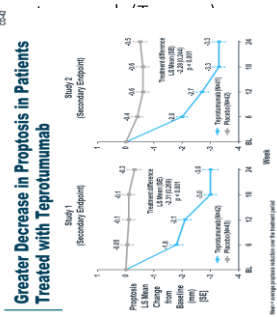
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Treatment – Teprotumumab (Tepezza)

8 infusions - Treat^{1,2,3}

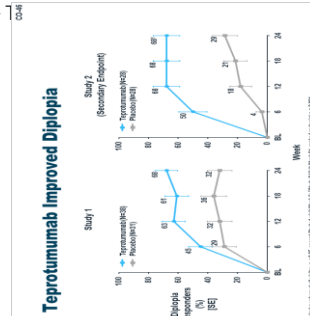


Treatment – T



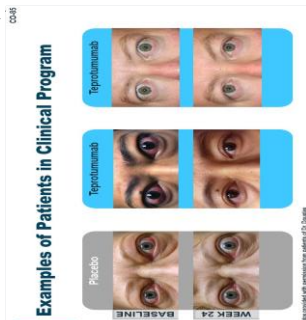
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Treatment – T



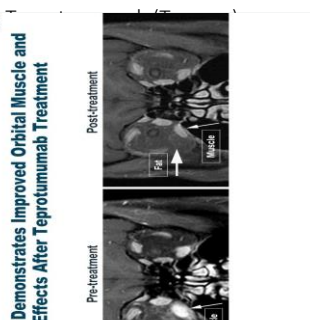
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Treatment – T



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Treatment – T



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Kearns-Sayre Syndrome

- Affects many parts of the body
- Usually appears before 20 years old
- Caused by mitochondrial DNA abnormalities
- Causes progressive external ophthalmoplegia
 - i. Paralysis of extraocular muscles
 - ii. Ptosis
- Pigmentary retinopathy

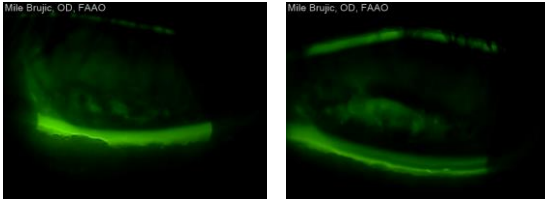
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Kearns-Sayre Syndrome

- Other systemic findings
 - i. Cardiac conduction defects
 - ii. Ataxia
 - iii. Other muscle weakness
 - iv. Deafness
 - v. Kidney problems
- Occurs because of mitochondrial deficiencies
- Prevalence: 1-3/100,000

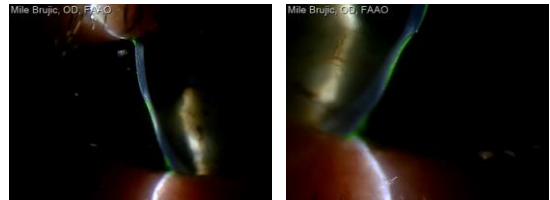
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Kearns-Sayre Syndrome



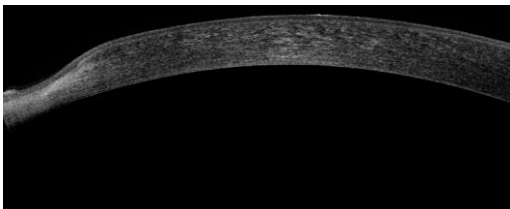
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Kearns-Sayre Syndrome



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Kearns-Sayre Syndrome



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Kearns-Sayre Syndrome

- Ointment in the evening
- Sleep rite
- Eye mask in the evening
- Blepharoplasty
- Lacriserts
- Punctal occlusion

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Mucous fishing syndrome

- Cyclical worsening of symptoms
- Patients will "fish" mucous out of their eye usually from some irritant
- Mucous usually in the lower fornix
- Continual attempted removal causes more mucous to be formed
- Treatment often times requires educating patients to stop touching their eyes

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Advancing Wavelike Epitheliopathy

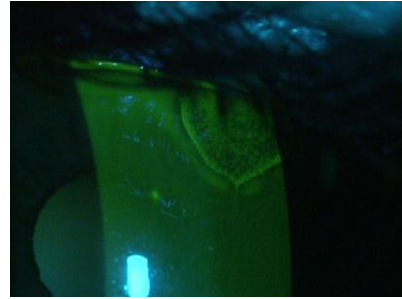
- Wave like appearance of epithelium that extends from the limbal area into the central cornea
- Is believed to be caused by toxic reaction of the cornea
- Differential diagnosis
 - i. Superior limbic keratoconjunctivitis
 - ii. Limbal stem cell disease
 - iii. Epithelial basement membrane dystrophy

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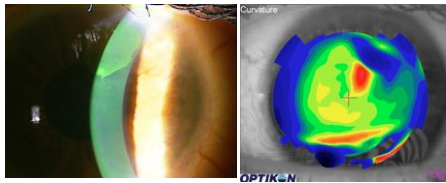
Advancing Wavelike Epitheliopathy

- Remove those substances believed to be causing the response
- Silver nitrate application to the limbal area where the irregularity appears to be originating from

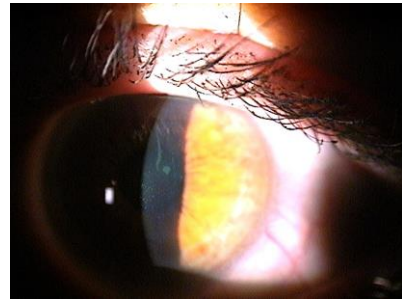
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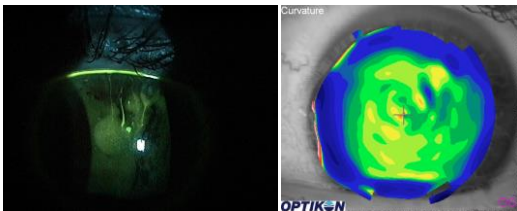
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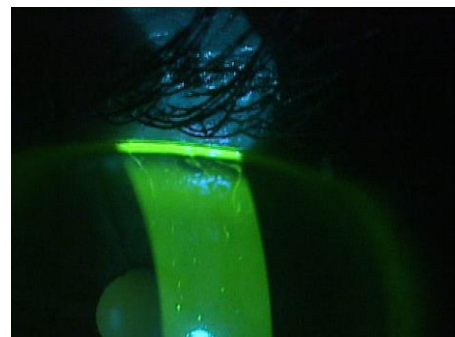
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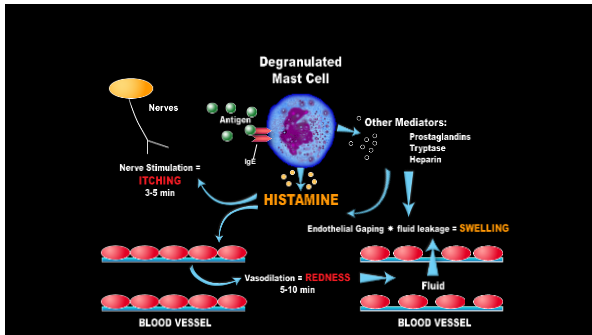
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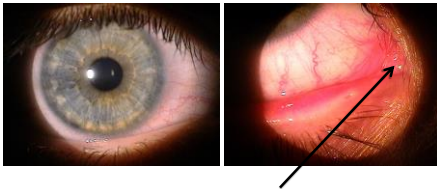
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Types of Allergic Eye Disease

- Acute allergic conditions
 - Seasonal Allergic Conjunctivitis - SAC
 - Perennial Allergic Conjunctivitis - PAC
- Chronic allergic conditions
 - Vernal Conjunctivitis - VKC
 - Atopic Conjunctivitis - AKC
 - Giant Papillary Conjunctivitis - GPC

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Misunderstanding the Itchy Eye



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Allergic Conjunctivitis: Seasonal / Perennial

- | | |
|-----------------------------------|------------------------|
| <i>Causes:</i> | <i>Signs/Symptoms:</i> |
| Environmental | Itching |
| Genetic predisposition | Redness |
| | Chemosis |
| <i>Findings:</i> | Lid swelling |
| Family history | Tearing |
| No eosinophils found in scrapings | |
| Spike in tear histamine | |
| Normal histaminase function | |

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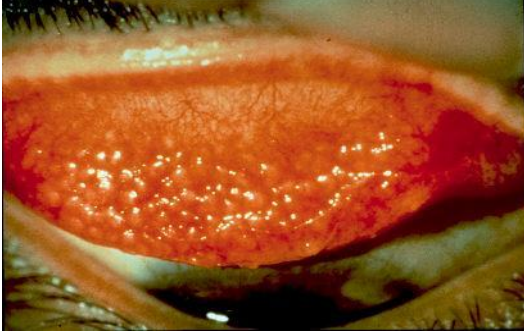


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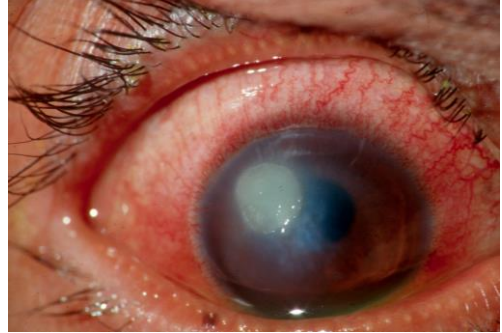
Atopic Keratoconjunctivitis (AKC)

- | | |
|---|--------------------------|
| <i>Causes:</i> | <i>Signs/Symptoms:</i> |
| Associated with atopic dermatitis | Itching |
| May be perennial | Redness |
| Genetic predisposition | Photophobia |
| Environmental antigens | Keratopathy |
| | SPK/Ulcers |
| <i>Clinical Findings:</i> | Keratoconus |
| Initiates between 20 and 50 years of age | Anterior polar cataracts |
| Elevated levels of eosinophils, TH ₂ , lymphocytes, and mast cells | Mucous discharge |
| | Atopic blepharitis |

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Vernal Keratoconjunctivitis (VKC)

Causes:

Genetic predisposition, atopy
 Seasonal/perennial allergens (IgE)
 Nonspecific hypersensitivity

Clinical Findings:

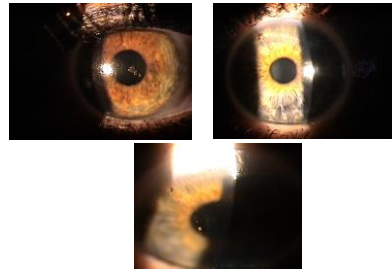
Most predominant in males from 3 to 20 years old
 Increased levels of superficial mast cells, eosinophils, and lymphocytes
 Decreased levels of histaminase

Signs/Symptoms:

Ptosis
Ropy mucous discharge
Photophobia
Large, nonuniform cobblestone papillae
Trantas dots
Limbal nodules
Neovascularization
Shield ulcers
Itching

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Contact Lenses



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Giant Papillary Conjunctivitis (GPC)

Causes:

Repeated mechanical irritation caused by:

- Contact lens edge
- Exposed sutures
- Extruded scleral buckle
- Ocular foreign bodies

Aggravated by concomitant allergy

Can also aggravate ocular allergy

Clinical Findings:

Increased chronic inflammatory cells

Signs/Symptoms:

Decreased CL tolerance
Blurred vision
Foreign body sensation on upper tarsal plate
Thick mucous build-up

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Treatment Options

- Topical Medications
 - Antihistamine/ Mast Cell Stabilizer Combinations
 - Blocks Histamine receptors on blood vessels, nerve endings, etc
 - Inhibits histamine degranulation from sensitized mast cells so that when these cells are challenged with antigen, they do not degranulate
 - Patanol, Pataday, Elestat, Zaditor, Lastacaft, Bepreve

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RASP Inhibitors

- www.aldeyra.com
- Aldehyde is a product of metabolism
- Normally rapidly broken down
- With inflammation, is produced in quantities that are difficult to breakdown efficiently
- RASP – Reactive aldehyde species
- Reproxalap – Is a RASP inhibitor

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Tear-Based POC Quantitative Testing

- 1 Rapid
- 2 Repeatable
- 3 Reproducible
- 4 Reimbursable



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T-POC IgE Testing: Is There An Allergic Component?

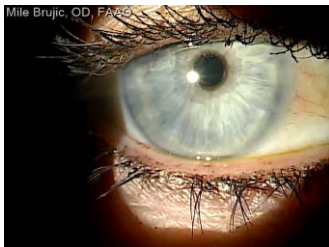
- Benefits of testing IgE levels in the tear film:
 - Presence of IgE indicates the diagnosis of allergic conjunctivitis
 - Levels of IgE increase with the severity of the allergic response
 - IgE testing can help differentiate allergic conjunctivitis from DED
 - Changes in IgE levels may show the efficacy of prescribed treatment
- IgE value is < 80 ng/mL (33 kIU), there is a 95.7% probability that the patient does not have an ocular allergy
- IgE value is > 80 ng/mL, there is a 92.9% probability that this elevated IgE is indicative of an ocular allergy



Sensitivity: 93%
 Specificity: 90%
 High IgE: < 9% CV
 Test Time: < 80s/pt
 Normal IgE: < 80 ng/ml
 Shelf Life: 12 months

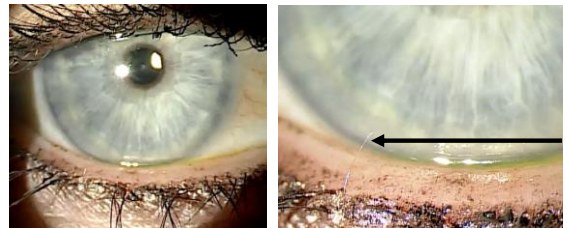
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Trichiasis



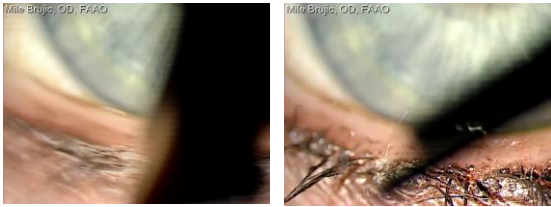
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Trichiasis



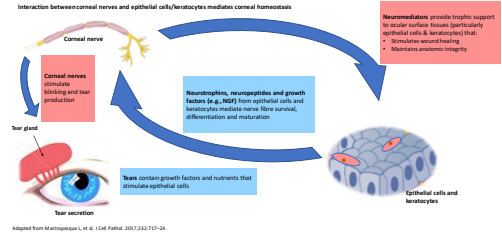
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Trichiasis



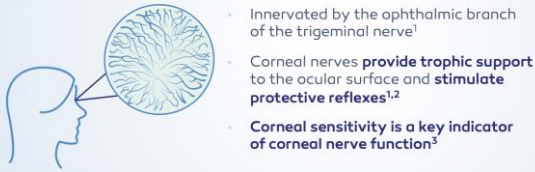
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Ocular Surface BEYOND the TEARS



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The Cornea is the Most Densely Innervated Tissue in Our Body

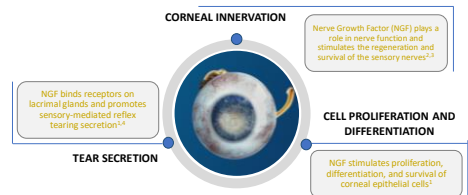


1. Montopalan L, Montopalan D, Gupta M, Gnanapavan M. Understanding the pathogenesis of neurotrophic keratitis: The role of corneal nerves. J Cell Physiol. 2013;202(6):717-24. 2. Qian H, Qian J, Stevens DM, et al. Neurotrophin levels in human tear film. Invest Ophthalmol Vis Sci. 2016;57(12):4213-21. 3. Qian H, Hsieh SC, Qian H. It's always interesting about the diagnosis, method and treatment strategies for the corneal sensory deficit. Arch Ophthalmol. 2010;128:16-22.

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Endogenous NGF is Believed to Support Corneal Integrity Via Three Mechanisms

SHOWN IN PRECLINICAL MODELS¹



1. Montopalan L, Montopalan D, Gupta M, Gnanapavan M. Understanding the pathogenesis of neurotrophic keratitis: the role of corneal nerves. J Cell Physiol. 2013;202(6):717-24. 2. Qian H, Qian J, Stevens DM, et al. Neurotrophin levels in human tear film. Invest Ophthalmol Vis Sci. 2016;57(12):4213-21. 3. Qian H, Hsieh SC, Qian H. It's always interesting about the diagnosis, method and treatment strategies for the corneal sensory deficit. Arch Ophthalmol. 2010;128:16-22. 4. Gnanapavan M, Corneal sensory structure, content and function. Exp Eye Res. 2013;114:502-514. 5. Gnanapavan M, Lombard A. Diagnosis and management of neurotrophic keratitis. Ocul Immunol Inflamm. 2016;24(1-3):104-111. 6. Gnanapavan M, Corneal sensory structure, content and function. Exp Eye Res. 2013;114:502-514.

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NK is Progressive and May Lead to Irreversible Ocular Surface Damage and Potential Vision Loss



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MEDICAL HISTORY

An assessment of risk factors is critical to identifying NK, especially in early stages of the disease

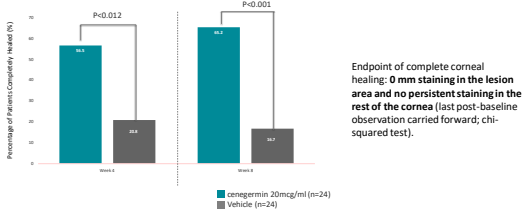
- Post-herpetic infection (VZV, HSV)
- Chronic dry eye disease
- Contact lens wear
- Ocular surgery (eg, cataract, refractive, PKP)
- Topical ophthalmic drug toxicity (eg, glaucoma drops)
- Diabetes
- Stroke
- Multiple sclerosis

A patient with one or more of these risk factors should prompt your suspicion of NK¹⁻⁴

Question for systemic immune disorders should be considered

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65.2% of Patients Had Complete Corneal Healing at week 8



Phyllis SC, Mawardi GH, Patel VL, et al. (2019) Efficacy of Cenegermin in the Treatment of Neurotrophic Keratopathy. *Ophthalmology*. doi:10.1016/j.ophtha.2019.08.010

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aesthesiometer



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IMPAIRED CORNEAL SENSITIVITY

Corneal sensitivity testing (CST) is fundamental to NK diagnosis

PRACTICAL METHODS
Tip of tissue, cotton wisp, dental floss

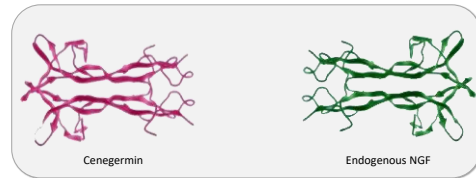
CONSIDERATIONS

- Gently touch all 4 quadrants and center
- Record as normal, reduced, absent

➔ **Decrease in or loss of corneal sensitivity is the hallmark sign of NK**

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Cenegermin Mimics the Structure of Endogenous NGF in the Ocular Tissues



Cenegermin-bkbj, the active ingredient in the FDA-approved OXERVATE™ (cenegermin-bkbj ophthalmic solution) 0.002% (20 mcg/mL), is structurally identical to the human NGF protein found in ocular tissues

Wardell B. New Drug Trends Data, Differentiating Neurotrophic Keratitis. *JAMA*. 2018;320(15):1500.

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Dry eye due to MGD is an inflammatory disease

MGD is often a skin gland disease

abnormal blood vessels release pro-inflammatory agents. These inflammatory agents propagate to the eyelids via the orbital vasculature.

Source: Gelfand et al. *J Invest Dermatol* 2013

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Intense Pulsed Light

1. Warms Meibum
2. Emits Energy that absorbed by chromophores in hemoglobin and closes abnormal vessels in the eyelid margin and adjacent conjunctiva. Prevents release of inflammatory factors by the vessels
3. Reduces inflammatory factors in tears (interleukin 17A, Interleukin-6, prostaglandin E2) (up-regulates expression of anti-inflammatory agents while downregulating pro-inflammatory agents)
4. Activates fibroblasts and enhance collagen production
5. Reduce inflammatory or neurogenic pain
6. Reduction in bacterial load and demodex to reduce inflammation

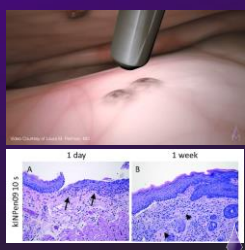
90

Thank you Dr. Laura Periman for the following slides on conjunctivochalasis plasty

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Plasma Pen CCh-plasty

- Used extensively in aesthetics, dermatology for non-invasive treatment of mild to moderate rhytids, skin tags, AK, xanthelasma, angioma, telangiectasias, acne scars, skin tightening ("non surgical blepharoplasty")
- Controlled plasma arc that induces tissue contraction and triggers fibroblast collagen remodeling
- Highly controlled contraction of the conjunctiva with minimal thermal damage

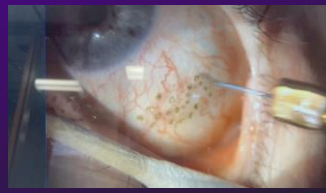


Jablonski et al. Side effects by oral application of atmospheric pressure plasma on the mucosa in mice. PLOS ONE. 14 e 0219299. 10.1371

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Plasma Pen CCH-plasty Technique

- Pre-Procedure: Lid scrub, proparacaine soaked pledget, brimonidine, moxifloxacin or tobra-dex drops
- Post-Procedure: combination antibiotic-steroid, perflurohexyloctane
- Tylenol for pain control
- Patients report relief in CCh symptoms starting day 3

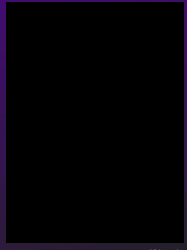


Videos: Laura M Periman MD

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Plasma Pen CCH-plasty Technique

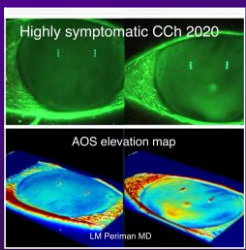
- Pre-Procedure: Lid scrub, proparacaine soaked pledget, brimonidine, moxifloxacin or tobra-dex drops
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- Tylenol for pain control
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Videos: Laura M Periman MD

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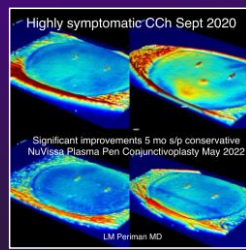
Plasma Pen CCh-Plasty Cases



Highly symptomatic CCh 2020

AOS elevation map

LM Periman MD




Highly symptomatic CCh Sept 2020

Significant improvements 5 mo sip conservative NuVena Plasma Pen Conjunctivoplasty May 2022

LM Periman MD

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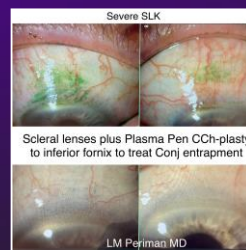
Inferior CCH-plasty Improved SLK



CCh entrapment under scleral lenses

6 weeks after plasma pen CCh-plasty

LM Periman MD



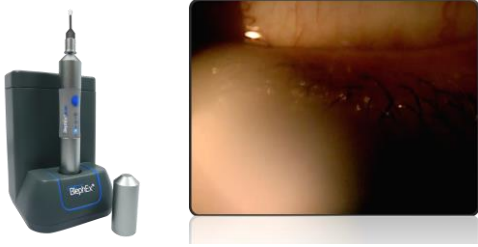
Severe SLK

Scleral lenses plus Plasma Pen CCh-plasty to inferior fornix to treat Conj entrapment

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MICROBLEPHAROEXFOLIATION (MBE)



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Lid Margin Hygiene Protocol

- 1) Identify condition
- 2) Photo document (video capture at slit lamp)
- 3) Discussion with patient
- 4) Rx antibiotic/steroid combination 1 gtt bid to qid OU rubbing medication into lid margin after instillation or tea tree oil
- 5) Patient to return in 1 week for follow up
- 6) Return for microblepharoexfoliation procedure
- 7) Photo document (video capture at slit lamp) pre and post procedure
- 8) Use medication for one more day
- 9) Continue on maintenance therapy (Hypochlorous Acid)

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Microblepharoexfoliation Protocol

- 1) Prepare blephex
- 2) Place 1 gtt proparacaine OU
- 3) Blephex upper and lower left lid margin
- 4) Rinse with addipak solution (non-preserved NaCl)
- 5) Blephex upper and lower right lid margin
- 6) Rinse with addipak solution (non-preserved NaCl)
- 7) 1 gtt lumify OU**
- 8) Photodocument lid margins

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Lotilaner Ophthalmic Solution 0.25%



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Effectiveness of a Singular Ocular Rinse via Irrigating Eyelid Retractor to Reduce MMP-9 in Patients with Dry Eye Disease

Nandini Venkateswaran, MD ABO
Natasha Mayer, BSc

ASCRS 2023

San Diego, California

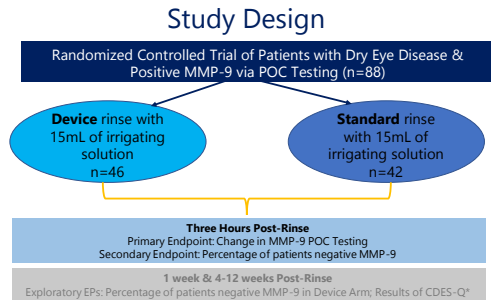
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Objective

Eye rinsing has been an effective method to reduce Matrix Metalloproteinase-9 (MMP-9), a hallmark of surface inflammation

A single ocular rinse assisted via **irrigating eyelid retractor** effect on MMP-9

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Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • ≥18 years of age with dry eye complaints • Positive MMP-9 via Point-of-care testing 	<ul style="list-style-type: none"> • Anti-inflammatory medication usage • Artificial tear or topical ocular medication usage within the past 14 days • Intraocular surgery within the past 6 months • Contact lens wear within past 12 hours • Contraindication to MMP-9 POC testing • Acute allergic or infectious conjunctivitis • History of SJS or cicatricial conjunctival disease • Severe dry eye preventing wetting of the POC testing

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Irrigating Eyelid Retractor

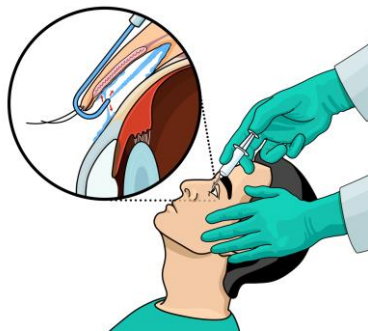
Fixed to a syringe, the retractor has 5 ports which aim fluid at the palpebral conjunctiva, bulbar conjunctiva and conjunctival fornix.



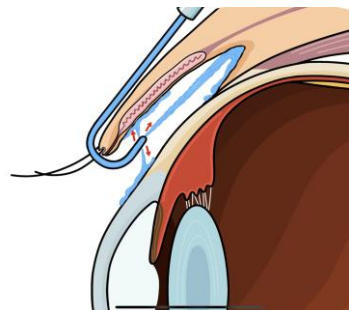
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scientific reports

OPEN Assessment of reliability and validity of the 5-scale grading system of the point-of-care immunoassay for tear matrix metalloproteinase-9

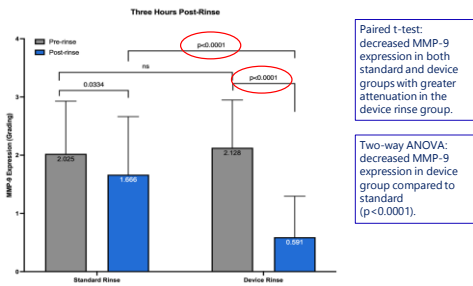
Minyoung Kim, Ja Hyung Oh, Seon Ho Baek, Seung Hyeon Lee, Woo Jun Lee, Yeon Seok Chon & Kyung Wook Kim

Standard photographs	0	1	2	3	4
Control zone	Negative	Trace	Weak positive	Positive	Strong positive
Interpretation	0	1	2	3	4
Grade	0	1	2	3	4

Figure 4. Standard photographs for 5-scale grades ranged from 0 to 4 along to the color density of the red band in the redox window of the point-of-care matrix metalloproteinase (MMP)-9 immunoassay.

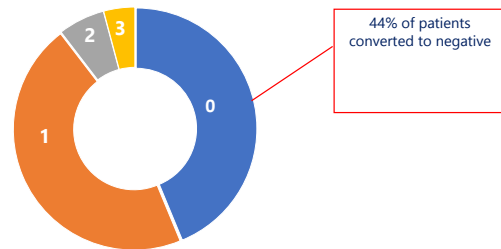
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Results—Primary Endpoint



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Results—Secondary Endpoint



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Conclusion

A novel irrigating eyelid retractor rinse of the ocular surface statistically reduces MMP-9 levels compared to baseline and is superior to a standard eye rinse.

Use of an irrigating eyelid retractor may be a therapeutic avenue for those patients with dry eye disease.

Further work on the durability of these findings is ongoing.

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ARS Polling Instructions

- Step 1 - Open the Vision East app and log in using your badge ID and last name
- Step 2 - Head to the Connect & Learn tab and tap on All Education Sessions
- Step 3 - Select the course you are attending from the list of sessions
- Step 4 - Scroll to the bottom and select "Pre-course questions" prior to the session or "Post-course questions" after the session
- Step 5 - Complete the survey question and Submit!

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Thank you

mile.brujic75@gmail.com

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