Innovations In Dry Eye Treatments

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Disclosures

Consultant/Speaker
• Allergan
• Alcon
• Johnson & Johnson Vision
• BioTissue
• Shire
• Founder, Oculus Consulting Partners
• Contributing Editor Optometric Management
Optometry: Primary Eye Care Providers

- One baby boomer turns 65 every eight seconds
- 10,000 people turn 65 every day
- 4.2 million a year by 2030
- Up to 33 million Americans suffer from dry eye

The Ocular Surface

• A unique environment that’s very delicate yet resilient

• Affected by many conditions

• Treating ocular surface conditions are within the mainstream of modern optometric practice

• OD’s are the Primary Eye Care Providers Today!
Practice Growth Opportunity

- Medical eye services help bring in patients
- Leads to increased spectacle sales
- Enhances contact lens care
- Patient retention = increased revenue
- Greater word of mouth (referrals)
- Greater overall growth in all areas (optical, medical, CL's)
Prevalence of Dry Eye

• 65% of contact lens wearers report dry eye limiting their wear time
• 52.7% of contact lens wearers self-report with symptoms of ocular dryness\(^1\)
• 77% report dry eye to be bothersome
• Eye care professionals often ignore and undertreat dry eye and other ocular surface diseases

Gender

Prevalence is higher in women and older age groups

Dry Eye in the Physicians Health Study\(^4\) (Men)

Dry Eye in the Women’s Health Study\(^5\)
Dry Eye Risk Factors

- Age
- Gender
- Environment - air conditioners, fans, heaters, airplanes
- Computer use
- Lifestyle - smoking, diet, work demands
- Systemic meds
  - Antihistamines, HRT/BC, antidepressants, B-blockers, diuretics, ACE inhibitors
- Diet
  - Omega 3:6, alcohol, caffeine intake, water
Dry Eye Risk Factors

- Contact Lenses

- Surgical – Refractive Surgery, Cataract Surgery, Ocular Surgery

- Systemic Diseases and Autoimmune Disease
Dry Eye Risk Factors: Systemic Diseases

- Diabetes
- Rheumatoid Arthritis (RA)
- Systemic Lupus Erythematosus (SLE)
- Sjogren's
- Thyroid Eye Disease
- Dermatological Conditions
  - Rosacea, Psoriasis
- Inflammatory Systemic Diseases
  - Chrohn’s, IBS
3 Pearls ("P’s") for Success

1. Prepare for the medical model
   - Create Office Forms
   - Staff Training (huddle ups, weekly, monthly)
     - front staff, techs, check out
   - Questionnaires
   - Workflow
   - Dry eye exam testing protocol for staff and docs
   - Dry eye treatment protocol
Staff Training: Front Office

- Front Staff
  - Scheduling
  - Paperwork
  - Medical Vs. Vision
  - Phone scripts
Staff Training: Techs and Ancillary Staff

• Establish:
  – diagnostic testing protocols
• Treatment plans prescribed by your doctor
• In-office treatments you offer and perform?
• Retail products available at your clinic
• Basic dry eye signs and symptoms
• Any other necessary insight you feel is necessary
3 Pearls ("P’s") for Success

• 2. Pick the appropriate diagnostics you want to do
  – Fluorescein
  – Lissamine Green
  – Shirmer’s
  – Combo dyes
  – MMP-9 detection
  – TBUT
  – Slit lamp photo
  – Tear meniscus height
  – TearLab/osmolarity
  – Phenol Red Thread
  – Case history
  – Meibography
  – Questionnaires
  – Interferrometry
  – Blink rate
DIAGNOSTICS
Tech Exam : Proper Test Flow Sequence

- Questionnaires
- Case History
- Interferometry
- Meibography
- Blink evaluation
- Tear osmolarity
- Tear production tests
- MMP 9 detection testing
### SPEED Questionnaire

**Name:** __________________________, __________________________
**DOB:** ____/____/______
**Sex:** M  F  (Circle)

How **FREQUENTLY** do you experience the following dry eye symptoms?

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Never (0)</th>
<th>Sometimes (1)</th>
<th>Often (2)</th>
<th>Constant (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryness, Grittiness or Scratchiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soreness or Irritation</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Burning or Watering</td>
<td></td>
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</tr>
<tr>
<td>Eye Fatigue</td>
<td></td>
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</tr>
</tbody>
</table>

How **SEVERE** are your dry eye symptoms?

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No problems (0)</th>
<th>Tolerable – not perfect but not uncomfortable (1)</th>
<th>Uncomfortable – irritating but does not interfere with my day (2)</th>
<th>Bothersome – irritating and interferes with my day (3)</th>
<th>Intolerable – unable to perform my daily tasks (4)</th>
</tr>
</thead>
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</tbody>
</table>

**WHEN** have you experienced these symptoms?

- ( ) Today
- ( ) Within the past 72 hours
- ( ) Within the past 3 months

<table>
<thead>
<tr>
<th>Activities</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have difficulty reading?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have difficulty using a computer?</td>
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<tr>
<td>Do you have difficulty driving?</td>
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<tr>
<td>Do you have difficulty watching television?</td>
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<td></td>
</tr>
<tr>
<td>Do you have difficulty wearing contact lenses?</td>
<td></td>
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<tr>
<td>Do you have difficulty being outdoors?</td>
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<td></td>
</tr>
<tr>
<td>Do your symptoms worsen throughout the day?</td>
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</tr>
</tbody>
</table>

**If yes, which drops and/or ointment do you use?**

____________________________________________________

____________________________________________________

**How frequently do you use the drops and/or ointment?**

____________________________________________________

Total SPEED score (Frequency + Severity) = ____/28
Dry Eye Summit questions (2014)
Questions

1. Do your eyes ever feel dry or uncomfortable?
2. Are you bothered by changes in your vision throughout the day?
3. Are you ever bothered by red eyes?
4. Do you ever use or feel the need to use drops?
Case History

Tech Reviews:

- systemic meds
- systemic health
- autoimmune diseases
- risk factors
- surgical history
- current drops and medications
- other
Interferometry

- Lipiview® I & II
- Oculus Keratograph® 5M
Interferometry uses the light pattern from one image to highlight differences in the other.

The LipiView Ocular Surface Interferometer is an ophthalmic imaging device, which measures lipid layer thickness, blink rate and efficiency by capturing and analyzing 20 seconds of video per eye.
Lipiview® II

- Uses a light-emitting lid everter
- Allows for selection of images from 3 modes
- High resolution images utilized in patient education
LipiScan™

- 10 seconds per eye
- High Definition
- Under normal lighting
- User-friendly
- Small footprint
Interference Pattern

Lipid Layer of the Tear Film
Meibography

- Transillumination
- LipiView® II
- Oculus Keratograph® 5M
- LipiScan®
- Meibox
Meibography
Intervention & Prevention

Current model of treatment is interventional.

Future of MGD treatment must be preventative.

Heiko Pult, Meibography in Clinical Practice, Ophthalmology Times Europe June 2012
Infrared vs. Transilluminated

A single gland has been traced in each image to illustrate that the glands are lighter under infrared light and darker under transilluminated light, relative to the background tissue.
Blink Evaluation

• Blink Rate
  – Various diagnostics (LipiView I, II)
  – Oculus Keratograph® 5M
  – Manual

• Blink Quality
  – Partial blinks
  – Incomplete blinks
Tear Osmolality
Hyperosmolarity

- Central pathophysiological mechanism for all forms of DED
- Causes inflammation and apoptosis & reduces the ability of mucins to lubricate
- Leads to a breakdown of homeostatic control causing tear film instability
- 308 mOsm/L is a highly sensitive cut-off point that delineates a normal from a mild/moderate dry eye population
- Inter-eye difference = hallmark of DED ( > 8 mOsms/L between eyes)
- Unstable tear film causes inter-eye differences
• The TearLab Osmolarity System is the first objective and quantitative test for diagnosing and managing Dry Eye patients
• Fast and accurate results in seconds using only 50 nanoliters (nL) of tear film to diagnose Dry Eye Disease
• Enables discussion with patients around a number improving compliance
• Incorporating osmolarity into the standard of care gives the best indication of early stage disease
Tear Volume Testing

Schirmer’s Test
• Requires anesthesia
• 5 minute testing time
• Mildly irritating
• Normal results: > 10mm

Phenol Red Thread
• No anesthesia required
• 15 seconds testing time
• Little discomfort
• Normal results: > 20mm
Red Phenol

ZONE-QUICK

STERILIZED

ZONE-QU
Other Tear Tests

• Tear Meniscus Height
  – Manual
  – Diagnostics

• Tear Stability: Tear Break Up Time (TBUT, NIBUT)
  – Less than 8-10 seconds abnormal
Matrix metalloproteinases (MMP) are proteolytic enzymes that are produced by stressed epithelial cells on the ocular surface¹

- **MMP-9 in Tears**
  - Non-specific inflammatory marker
  - Normal range between 3-41 ng/ml
  - More sensitive diagnostic marker than clinical signs¹
  - Correlates with clinical exam findings¹
  - Ocular surface disease/dry eye demonstrates elevated levels of MMP-9 in tears¹

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InflammaDry Product Overview

• Identifies elevated levels of MMP-9 in tear fluid
• CLIA-waived: Easy-to-use test can be performed by an OD or a technician
• Rapid: 10 minute results
• Reimbursable: $15.74, CPT Code 83516
• In-office: point-of-care immunoassay test aids in diagnosis at the time of office visit
• Low cost: disposable test, no additional equipment required
**InflammaDry** 4-Step Process

**INFLAMMADRY SIMPLE 4-STEP PROCESS**

**Step 1 - Collect Sample**

Gently dab the sample collector in 6-8 locations on the palpebral conjunctiva, until the fleece glistens, to collect a tear sample.*

**Step 2 - Assemble Test**

Snap the sample collector into the test cassette and press firmly where indicated. A double-click means the test is properly assembled.

**Step 3 - Run Test**

Immerse the absorbant tip into the provided buffer vial for 20 seconds. Replace the cap and lay the test flat on a horizontal surface.

**Step 4 - Read Results**

After 10 minutes, read the test results.

- **RED + BLUE = POSITIVE**
- **BLUE = NEGATIVE**

* * Release the lid after every 2-3 dabs. Allow the sampling fleece to rest along the conjunctiva for 5 seconds.*
Normal levels of MMP-9 in human tears ranges from 3-41 ng/ml

**POSITIVE TEST RESULT**
MMP-9 ≥ 40 ng/ml

**NEGATIVE TEST RESULT**
MMP-9 < 40 ng/ml
THE DOCTOR’S EXAM
Vital Dyes

- NaFL
- Lissamine Green
- Rose Bengal
Type of Dry Eye

- Aqueous and Mucin Deficiency
- Lipid Deficiency/MGD
Lissamine Green Staining
Line of Marx
Forced digital or cotton-tipped expression, current standard of practice to evaluate MG, is not constant & standardized.

From visit to visit & patient to patient, current standard of practice is not repeatable & consistent.

Meibomian Gland Evaluator (MGE) applies standardized force of ~1.25 gram/mm² or 0.3 PSI to mimic normal blink force and provides a metric for evaluation.
Microlagophthalmos Lid Seal Exam
Keys to Success for Dry Eye

• What Separates Successful Doctors From Other Docs?

• Examine and Diagnose!
  – Assume patient has a MEDICAL diagnosis until proven otherwise
  – Chief complaint important

• Develop and Rx a treatment plan

• “You have a chronic inflammatory eye disease”

• Must schedule a follow up visit

• Proactive vs. Reactive
  – Why wait?
Dry Eye Treatments

- AT’s
- Ointments
- Restasis
- Corticosteroids
- NSAID’s
- Punctal Occlusion
- Lacrisert
- Autologous Serum
- Vitamin A drops
- Moisture goggles
- Topical Androgen
- Doxycyclines/Azithromycin
- Tissue engineering
- Labial, parotid, submandibular gland transplantation
- Evoxac
- Omega 3:6 FA’s
- HRT
- Botox
- Accupuncture
- Herbal remedies
- Mucin replacement
- Amniotic membranes
- Thermal Pulsation
- IPL/BBL
- Neurostimulation
Keys to Success for OSD

MUST schedule follow up exam!

- Objectively measure signs to track improvement
- Document baseline findings
- Appropriate diagnostic testing
- Patient education key
- Slow things down at baseline exam
“I’m not sure what drop I am using every two hours”
Treating Ocular Surface Disease

Restasis clinically proven in studies to:

- Increase TBUT
- Decrease Corneal Staining
- Decrease Conjunctival Staining
- Increase Shimer’s scores/tear production
- Decrease dependence of AT’s
- Decrease subjective blur/blurry VA
- Decrease/stop dry eye severity level progression
- Increase Goblet cell proliferation
- Increase CL wear time
Xiidra

- Newest FDA approved dry eye drug
- Treatment protocols still emerging
Dry Eye/KCS Coding and Billing

- Keratoconjunctivitis Sicca (H16.22x)
- Punctate Keratitis (H16.14x)
- Exposure Keratoconjunctivitis (H16.21x)
- Neurotrophic Keratoconjunctivitis (H16.23x)
- Corneal Disorder due to CL’s (H18.82x)
- Sjogren’s KCS (M35.0)
In a 2012 study by Lemp et al, **85.5%** of patients were identified with MGD

MGD Treatment Options

- Azithromycin
- Restasis
- Lid hygiene- scrubs, foams, sprays
- Warm compresses
- Oral Doxycycline, azithromycin PO
- Antibiotic/steroid combination drops/ointments
- Lid/Gland Expression
- IPL/BBL
- Omega 3 Supplementation
- Gland Ductal Probing
- LipiFlow Thermal Pulsation System
Debridement – Physician’s POV
LipiFlow Thermal Pulsation System
The LipiFlow System is intended for the application of localized heat and pressure therapy in patients with chronic cystic conditions of the eyelids, including meibomian gland dysfunction (MGD), also known as evaporative dry eye or lipid deficiency dry eye.
MGD and New Treatment Options: BBL/IPL
Dryness and Contact Lens Wear

- Symptoms of ocular dryness cause many patients to reduce their contact lens wearing time or discontinue contact lens wear completely
  - 52.7% of contact lens wearers self-report with symptoms of ocular dryness\(^1\)
  - 12-21% are symptomatic enough to reduce their contact lens wearing time\(^2\)

Loss Of Revenue From Contact Lens Patients

• 1 Contact Lens Patient generates $326 annually

• 1 Lost patient leads to a loss of $24,000 over a lifetime in practice. ¹

• Contact lens dropouts are not obvious, they just disappear

• Proactive VS. Reactive Tx

Demodex Diagnosis

- Lash epilation, examine lid margin
  - View lash under light microscope to confirm mites
- Tx: In office and home
- Incidence of infestation increases with age
- 84 percent of the population at age 60
- 100 percent of the population older than 70 years of age
The Great Debate- Medical or Vision?
Initial Visit: Vision or Medical Insurance?

Patient presents for exam for glasses/CL’s
• OSD detected in case Hx and during exam

What do you do? Vision or Medical?
• Option 1
  - Bill comprehensive exam to vision plan
  - Self refer/reschedule for OSD work up

Versus
• Option 2
  - Bill comprehensive exam to medical plan
  - Medical follow up
• Brevium searches every patient's history nightly to identify lost patients
• Analyzes ignored recalls to find patients who missed or never scheduled an appointment after receiving a reminder
• Analyzes claims data to identify patients with diseases such as glaucoma, diabetes, dry eye, or cataracts who are overdue
• Even if no recall was ever entered
Brevium will:

- Ensure there's not already a pending appointment or recall
- Group family members into a single call
- Document contact attempts
- Determine whether and when to call again
- Keep the list current and complete
Dry Eye Retail Center - Don’t give away free money!

- Decreased confusion when trying to find this at the pharmacy or grocery store
- Ease of purchase since you offer premium products that are not found on the internet or at a retail store
- Convenience factor since we offer the same price or at times even better than what the item is valued for on the internet
Top Five Necessary Retail Products

1. Lipid based artificial tears/Aqueous based artificial tears
2. Lid hygiene products- Lid scrub pads, lid foams, sprays
3. Demodex Products
4. Lid moist heat mask
5. Nutritional products
I also recommend considering these other retail products:

• Hyerosmotic ointments
• Hyperosmotic drops
• Sleep goggles
• Lubricating ointments
• THANKS!

• Josh Johnston, O.D., F.A.A.O.

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