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JCAHPO Regional Meetings
2017
Did I Say Dry Eye?
Jim Mowbray, OD
Mayo Clinic

Dry Eye (or more appropriately Ocular Surface Disease) is An Age Old Problem That’s Getting Worse!

NEI/Industry Workshop 1995
“Dry eye is a disorder of the tear film due to tear deficiency or excessive evaporation associated with symptoms of ocular discomfort.”

Old Paradigm
- Dry Eye is a tear deficiency
- Wait for patient to report symptoms
- Send them on their way with tears

Old Paradigm
If that fails, try:
- More frequent use of tears
- A different brand of tears
- A “thicker” tear
- Plugs
Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability, with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.

It's time to go beyond that in our thinking about OSD and DES.

Which came first? Is dry eye caused by inflammation, or is inflammation a result of dry eye???
2017 DEWS II

- Due any day now
- Will it address inflammation?
- Will it discuss tissue changes?
- Will it cover asymptomatic patients?

Dry Eye and Quality of Life

The value for mild dry eye was equivalent to that of psoriasis.

The value of severe dry eye was equivalent to that of severe angina or disabling hip fracture.

Patients stated they would be willing to give up nearly 2 years of their lives to be free of severe dry eye.

Townsend, Contact Lens Spectrum, Sept. 2008

Average Direct Costs Associated with Dry Eye

- Average annual cost to payers: $783
- Overall annual direct cost to US Healthcare system: $3.84 billion
  - Uchino, Current Ophthalmology Reports June 2013

Indirect Costs to Employers of Dry Eye

- Absenteeism and Presenteeism:
  - $11,302 per employee
  - Nichols, Clinical and Epidemiologic Research June 2016

Statistics Worth Remembering

- 10 X more prevalent than glaucoma
- More symptomatic than glaucoma
- More debilitating than glaucoma until end stage

Beaver Dam Offspring Study 2014 Shocked us

- Adults 21-24 same incidence of DES as parents!
- Male = Female!
With increased digital device usage, we are seeing DES in younger and younger patients

How often have you seen this?

Or this?

Or this?

Per The Vision Council
Digital Eye Strain

- 88% of adults spend more than two hours per day using a digital device
- One in 10 people spend at least three-fourths of their waking hours on a digital device

Mechanics

- Average “relaxed” blink = 22 blinks/minute
- Book = 10 blinks/minute
- Computer = 7 blinks/minute
- As font size or contrast decreases, blink rate decreases. Tsutoba (New England Journal of Medicine 1993)
- In 100% of computer users 20% of blinks covered less than 50% of the cornea! Himebaugh Optometry and Visual Science 2009
Ocular surface disease is a life-long, progressive problem

We need to recognize these patients at an earlier stage in the disease process
By looking closely for OSD in ALL patients, we can prevent a lot of problems!

YOU are uniquely positioned to identify at risk patients!

- A typical eye exam is:
  - 60% history
  - 20% clinical examination
  - 20% ancillary testing
Multiple recent surveys reveal less than 30% of eye care practices query or screen patients for ocular surface disease!

Common Questionnaires
- CANDEES
- DEQI
- IDEEL
- iSC
- McNenney
- OSD-QuI
- OSDI
- SPEED
- SPEED II

Questionnaires can help, but aren’t all inclusive
- When asked, depending upon the survey, 15-50% of patients report DED symptoms, and 19% use drops daily.
- BUT 40% of MGD patients are asymptomatic!
- Over 60% of patients using daily drops report they really don’t help that much

So we can’t wait for patients to tell us they have dry eye, we need to ask them about symptoms and look for evidence of disease.

25 years ago this was pretty much the extent of our dry eye testing
Myriad options now

- Early detection is key!
- Never look at only 1 marker or test

Osmolarity Testing
Tear Lab
50 years after first reports of changes

Tear Osmolarity

- Less than 300 mOsm/L considered normal
- Less than 8 mOsm/L difference between eyes
- One of the few tests insurance reimburses
- Values obtained can vary over time

MMP-9
An inflammatory marker
InflammaDry
Easy to do

MMP-9

- Matrix Metalloproteinase-9 released by compromised epithelium
- Greater than 40 ng/ml
- Reimbursable by most insurance
- A late-stage sign, only catches 40% of known DES patients

Keratography
Non-invasive Keratograph break-up time (NIK BUT)
Shows tear film breakup
Keratography
- Detects subtle irregularities
- Excellent for detection of dry eye disease
- If no medical necessity (ex. Keratoconus, corneal dystrophy, etc.) generally not covered

Meibography
- Images the meibomian glands, has dramatically improved our understanding of DED
- Changes in shape or length, atrophy provide a lot of useful information

Meniscometry
- Lacks standardization
- Not reimbursable

Red Eye Scaling
Red Eye Scaling

- Measures the visible sclera to blood ration
- Multiple causes of red eye; does not differentiate

Lipid Layer Interferometry

Utilizes Moiré pattern

- Evaporation becoming more recognized
- Keratograph 5M, LipiView II if available, if not NaFL TBUT (but no magic number)
- Useful for initial exam, not for following

Add to the list

- Phenol Red Thread
- Impression Cytology
- Lysozyme Assay
- Lactoferrin Testing
- Scanning Fluorophotometry
- Confocal Microscopy

What If We Don’t Have The Technology?

Fluorescein Staining
- doesn’t detect early disease
- have to wait for dye to be taken up
- Location can help determine cause
Lissamine Green
Stains dead and
dying cells

Rose Bengal
Stains living cells
as well
Tends to sting

Korb evaluator
Identifies Non-obvious Meibomian Gland Dysfunction

Lid seal
transilluminate

Looks good
But......

Add a little pressure

Quick and Easy
Use a Q-Tip
Non-obvious MGD

- Patients are asymptomatic
- Eye lids and lid margins appear normal
- Must perform gland expression to identify

Let’s not forget these too!

Treatment?

- Consider the lids, the glands, and the ocular surface
- A 4-pronged treatment strategy:
  - Obstruction
  - Biofilm
  - Inflammation
  - Tear film stability
**OBSTRUCTION:**
- Warm compresses
- Manual expression
- Thermal pulsation

**Biofilm Treatment**

**Inflammation**

**Tear Film Stability**

**Mainstay of Therapies**
- Warm compresses, Lubricants/humidifier/no moving air/blink training
- Oral omega-3 supplements (re-esterified triglyceride vs ethyl ester forms)
- Steroids/antibiotic eyedrops
- Punctal plugs, Restasis/Xiidra
- Oral antibiotics, Lacrisert
- Lipiflow
- Intense pulsed laser
- Moisture chamber glasses, goggles

**Questions?**
Waxy appearance
- Telangiectasia
- Misdirected lashes
- Meibomian gland inspissation

Punctate staining
- Mild serration of lid line

Punctate staining
- Low lower lid position
- Likely incomplete blink

Lissamine Green
- Frothing

Lissamine staining
- Serrated margin
- Small tear prism

Where do I begin?
Serrated Margin
Shrunken Meibomian Glands
Misdirected lashes