LECTURE # 3

EYECARE REVIEW: PART I
FOR PRIMARY PHYSICIANS
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EYECARE REVIEW
FOR PRIMARY CARE PHYSICIANS

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BACKGROUND

- Undetected and untreated eye diseases and conditions are major public health problems that can lead to vision loss and blindness.

OBJECTIVES

- The objective of the study was to gather and analyze what primary care physicians know about vision health and disease and their attitudes, opinions, and practices regarding the counseling and treatment of their patients.

METHODS:

- The data was collected using a face-valid 69-question Web-based survey that included 17 questions specific to vision health.
- A random sample of 1,500 physicians was drawn from the Epocrates Honors Panel (a verified panel of 142,000 physicians).
- Physicians were screened to include only those who have been practicing medicine in the United States for at least three years and actively see patients.
RESULTS:

- Forty-eight percent of invited physicians responded to the survey. The respondent sample was very similar to published statistics regarding American physicians (e.g., race, ethnicity, and gender).
- Only 51 percent of physicians believe they have adequate knowledge to advise their patients on vision health.
- Further, only 58 percent believe they can identify patients at higher risk for eye disease.
- Conversely, nearly all physicians who treat patients with diabetes more frequently discuss eye health and disease with their patients, counsel their patients regarding the complications that diabetes presents for eye health and disease, and encourage regular eye examinations.

DISSCUSSION:

- Findings from this research reveal a need and an opportunity to better educate primary care physicians with regard to eye health and disease including how to recognize patients at higher risk of blindness and how to best counsel and refer their patients to seek Eye Care.

EYECARE REVIEW PART I
LEARNING OBJECTIVES

- Identify and recognize the various Anatomy and Structures of the Eye
- Know the refractive conditions of the Eye
- Understand causes of Crossed Eyes, recognize the many causes of Amblyopia and treatment options for these conditions

INTERESTING FACTS ABOUT THE EYE

- The eye is the second most complex organ in our body
- The cornea is avascular
- The eye muscles are the strongest and most active in the body
- Seeing is such a big part of everyday life it takes about half of the brain to get involved
- The eye requires no rest, at their A-game 24/7
- We blink about 25,000 times a day
- Your eyes are about 1 inch across and weigh about 0.25 ounce
LIDS

- Lashes—protection from foreign material
- Glands—lubricate anterior surface
  - Meibomian glands
  - Glands of Zeis
  - Glands of Moll
**CONJINTIVA**
- Thin, transparent, vascular layer lining
- Backs of eyelids
- Fornices
- Anterior sclera

**CORNEA**
- Composed of regularly oriented collagen fibers
- 5 layers
- Avascular
- Thickness of a human hair.
Sclera
- Tough outer shell
- Composed of collagen bundles
- Protects from penetration
- Two main function

ANTERIOR / POSTERIOR CHAMBER

IRIS
- Iris gives eye clues to systemic health
- Eye Colors WW
- 2 muscles:
  - Dilator—opens
  - Sphincter—constricts

PUPIL
- Allows light to enter
- Enables view to back of eye and eye health evaluation
- Effects to drugs

LENS
- Located behind iris
- Focuses light on retina
- Allows for accommodation
- Normally transparent
- Where cataracts form

<table>
<thead>
<tr>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral dilated pupil</td>
<td>Ill nerve compression (unilateral to haematoma)</td>
</tr>
<tr>
<td>Bilateral dilated pupils</td>
<td>Midbrain injury</td>
</tr>
<tr>
<td>Irregular pupils</td>
<td>Orbital trauma</td>
</tr>
<tr>
<td>Conjugate gaze deviation</td>
<td>Frontal lobe lesion</td>
</tr>
<tr>
<td>Small / pinpoint</td>
<td>Pontine injury, opiate administration</td>
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**CILIARY BODY**
- Primary functions
  - Pulls on lens for accommodation
  - Epithelium secretes aqueous fluid that fills anterior chamber

**VITREOUS HUMOR**
- Gel-like fluid that fills back cavity
- Serves as support structure for blood vessels while eye formed—before birth
- After birth, just 'hangs out' in there
- Where floaters are located

**FUNDUS**
- Interior surface of eye
- Includes
  - Optic nerve
  - Retina
  - Vasculature

**OPTIC NERVE HEAD**
- Collection of nerve fibers and blood vessels from retina
- Transfers info to brain's visual cortex
- Slightly yellow-pink when healthy
- White 'full moon' appearance can mean trouble!

**OPTIC NERVE HEAD**
- Cup is natural depression in center of nerve
- Cup size varies between people
- Very large cup, or change in appearance over time, can indicate glaucoma

**RETINA**
- Ten Layers
- Dense collection of three types of photoreceptors
- Fine detail and color vision located in Fovea
- Macular degeneration affects this area
- OCT makes the invisible, visible
PERIPHERAL RETINA
- Can only be evaluated with dilated pupil
- Important to evaluate periodically to fully assess eye health

VASCULATURE
- Include arteries and veins
- Only place in body where you can directly visualize blood vessels
- Excellent indicators of systemic diseases
  - HTN
  - Diabetes
  - High cholesterol
  - Carotid disease

OPTICS REVIEW
Myopia    Hyperopia
Astigmatism Prebyopia

MYOPIA
- Nearsightedness
  - See well up close but blurry in distance
  - Eye is too long
  - Light focuses in front of retina

HYPEROPIA
- Farsightedness
  - See well in distance
  - Eye is too short
  - Focus point is behind retina
ASTIGMATISM
- Surface of cornea is irregular or misshapen
- Light focuses at various points causing distorted vision
- Often combined with nearsightedness and farsightedness

PRESBYOPIA
- Normal, age-related change
- Near vision becomes difficult
- Mid-40s lens becomes less elastic and loses ability to change focus
- Time for bifocals...Nah, Progressive Lenses.

CROSSED EYES & AMBLYPOIA

CROSSED EYES - STRABISMUS
- Usually an early childhood vision disorder which the child “won’t out grow”.
- May Lead to severe complications if left untreated, poor self esteem and developing Lazy eye.
- 3 Kinds of Strabismus
  - Exotropia
  - Exotropia
  - Hyper/Hypo-tropia

Pseudo-strabismus
- In young infants, strabismus must be differentiated from the more common pseudo-strabismus
- Pseudo-esotropia as a result of a broad bridge of the nose. This is not a real eye crossing
THREE TYPES OF ESOTROPIA
1. Infantile (congenital)
2. Accommodative
3. Partially Accommodative

IF YOU SEE ESOTROPIA
- Refer to Eyecare Provider for Differential Diagnosis & Treatment
- Sooner the better for best chance of good vision

EXOTROPIA
- Eye turns outward
- Congenital—present at birth
- Surgery usually needed to re-align
- Many exotropias are intermittent
  - May occur when patient is tired or not paying attention
  - Concentration can force eyes to re-align
  - Vision therapy and/or glasses with prism can help

EXOTROPIA
- When intermittent
  - Brain sometimes receives information from both eyes (binocular)
  - Less chance of amblyopia
  - However, important to be seen by eyecare provider when deviation noted

HYPERTROPIA
- One eye vertically misaligned
- Usually from paresis of an extra-ocular muscle
- Typically much more subtle for patient to describe and provider to diagnose

TYPES
- Congenital
  - Most common type
  - Patients can compensate for years by tilting head
  - Can be discovered by looking at childhood photos
### TYPES
- **Acquired**
  - Trauma— Extra-ocular muscle ‘trapped’ by orbital fracture
  - Vascular infarct— Systemic diseases that affect blood supply to nerves can cause temporary nerve palsy
  - Diabetes and HTN most common
  - Palsies tend to resolve over weeks or months
  - Neurological
    - In rare cases a tumor or aneurysm can cause symptoms

### LAZY EYE - AMBLYOPIA
- Decreased vision uncorrectable by glasses or contacts— not due to eye disease
- For some reason, brain doesn’t fully acknowledge images seen

### LAZY EYE - AMBLYOPIA
- **3 Types of Amblyopia**
  - Strabismic
  - Refractive
  - Stimulus deprivation

### 1. STRABISMIC AMBLYOPIA
- One eye deviates from other and sends conflicting information to the brain
- Brain doesn’t like to see double— so “turns off” information from deviated eye
- Results in under developed visual cortex for that eye
- Can usually be reversed or decreased if treated early
- Need to visit eye care provider ASAP to determine cause and treatment options

### 2. REFRACTIVE AMBLYOPIA
- Significant difference in Rx between eyes
- Commonly one eye more farsighted
- Farsighted eye works hard to see clearly— and sometimes gives up
- Brain relies on info from other eye

### 2. REFRACTIVE AMBLYOPIA
- If not caught, one eye won’t learn to see as well as other
- Vision therapy and glasses are both beneficial
- Sooner the better
3. DEPRIVATIONAL AMBLYOPIA

- Any opacity in visual pathway can be devastating to developing visual system
  - Congenital cataracts
  - Corneal opacities
  - Ptosis (droopy eyelid)
  - Other media opacities

BINOCULAR VISION DYSFUNCTION PANDEMIC

- About 10% of the population has either some form of Strabismus or amblyopia.
- In comparison to other ocular diseases in children, Binocular Vision disorders are about 9X more prevalent.

TREATMENT

- If caught early, treatment can teach the brain how to see better
  - Vision therapy/patching
  - Glasses
  - Surgical re-alignment
- Early Eye Exams are critical!

Did you Know?

- Of the 3-4 million Babies born in the US
  - 1 in 20,000 has retinoblastoma
  - 1 in 25 will develop Strabismus
  - 1 in 30 will develop Amblopia

Infantsee.org