Pediatric Ophthalmology for the Primary Care Physician

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I have no financial interests to disclose
Objectives

1. Review anatomy
2. Review eye exam elements
3. Understand and improve vision screening in the PCP office
4. Describe indications for referral to pediatric ophthalmology
5. Identify the most common referrals to pediatric ophthalmology and basic treatment approaches
Anatomy
Anatomy
Ophtho exam

Visual acuity testing

- **OD**: right eye
- **OS**: left eye
- **SC**: without correction
- **CC**: with correction

- **CF**: count fingers
- **HM**: hand motion
- **LP**: light perception
- **NLP**: no light perception
Ophtho exam

Pupils
- Size and reactivity
- APD (afferent pupillary defect)

Intraocular pressure
- iCare
- TonoPen
- Applanation
Slit lamp exam: SLE
Slit lamp exam: SLE

L/L: lids/lashes
Slit lamp exam: SLE

C/S: conjunctiva/sclera
Slit lamp exam: SLE

K: Cornea
Slit lamp exam: SLE

AC: Anterior Chamber
Slit lamp exam: SLE

I: Iris
Slit lamp exam: SLE

L: Lens
Slit lamp exam: SLE

AV: Anterior vitreous
Dilated fundus exam: DFE

- Phenylephrine 2.5%
- Cyclopentolate 1%
- Tropicamide 1%
- Cyclomydrid (lower concentrations)
Dilated fundus exam: DFE

- Optic nerve
- C/d: cup to disc ratio
- From 0.0 to 1 (nl <0.3-0.5)
Dilated fundus exam: DFE

Macula
Dilated fundus exam: DFE

Vessels
Dilated fundus exam: DFE

Periphery
Cycloplegic refraction

How do you check glasses in babies???

- Retinoscopy
- It’s physics!
Cycloplegic refraction
Vision screening

- Vision
- Alignment
- Red reflex
Vision

0-3 months

• Blink to light
• Fix and follow slowly 180 degrees (faces)
• Interest in high contrast objects begins
Vision

3-6 months

- Track quickly (watch ball rolling across floor)
- Reach for objects
Vision

6-12 months

- Exploring world
- Picking up small objects/food
Vision

1-3 years

• Point to bus and plane
What can my baby see?

- 5 days
- 3 months
- 6 months
- 9 months

BabySee app
Visual acuity testing

- Check each eye separately
- Occluders
  - Kids will look between parents’ fingers
- No peeking (even on side gazes)
Visual acuity testing

- Method changes as children get older
  - Teller Cards
  - Lea symbols
  - Allen pictures
  - HOTV
  - Snellen
Visual acuity testing

- Crowding phenomenon
  - Line of figures > single optotype
  - Single optotype can overestimate visual acuity
  - If only able to use single optotype, then crowding bars are added
Vision

Refer:
The Clinical Report from the AAP, AAPOS, AAP, ACO
January 2016

Procedures for the Evaluation of the Visual System by Pediatricians

Vision screening is crucial for the detection of visual and systemic disorders. It should begin in the newborn nursery and continue throughout childhood. This clinical report provides details regarding methods for pediatricians to use for screening.
Referral criteria

- **Newborn to 12 months**
  - Inconsistent or no response (fix and follow) by 3 months
  - “any ocular abnormality of concern”
Referral criteria

1-3 years

- 20/50 or worse with either eye at 10 feet (10/25)
- LEA symbols
- HOTV
Referral criteria

4-5 years
- 48-59 months: 20/40 or worse
- 60+ months: 20/30 or worse
  - Snellen chart if possible
Referral criteria

CPT code:

- Visual acuity screening: 99173
- Photoscreening: 99174
Vision Screening

- Vision
- Alignment
- Red reflex
Strabismus

- Misalignment of the eyes in any direction
- Manifest (tropia): constant
- Latent (phoria): brought out by disruption of fusion
Alignment

Infants
- Penlight- corneal light reflex

Older infants/ toddlers
- Tongue depressor with sticker (near target)

Children
- Distance chart (pictures/ letters/ poster)

Keep them interested!
Alignment

- Pen light
  - Hirschberg- A
    - Estimate based on location of light reflex
  - Krimsky- B&C
    - Estimate using prism
Alignment

- **Cover- uncover**
  - Patient fixes on object
  - Cover over one eye for few seconds, rapidly removed

- Tropia: Observe eye not covered
- Phoria: Observe eye under the cover for movement
Alignment

- Alternate cover
  - Move rapidly back & forth
- Prism cover
- Alternate cover with a prism
Vision Screening

- Vision
- Alignment
- Red reflex
Red reflex

- Symmetric
- Superior crescents: hyperopia
- Inferior crescents: myopia
- Brighter in right eye: this is due to strabismus (Right Esotropia-RET 30 prism diopters)
Red reflex

- White pupil
- Dark spots on red reflex
- Absent or asymmetric reflex
Asymmetric reflexes

- Anisometropia
- Leukocoria: “White pupil”
  - Congenital cataracts
  - Retinoblastoma
Common referrals

Amblyopia
Strabismus
Capillary hemangioma
Congenital ptosis
Glaucoma
Nasolacrimal duct obstruction
Abnormal red reflex
Congenital cataracts
Trauma
Amblyopia

- “Lazy eye”
- Poor vision in an otherwise healthy eye, because the visual pathways did not develop normally during early childhood
- Poor image $\rightarrow$ poor brain development
- Visual cortex plasticity until $\sim$10-12 years old
- Use it or lose it
Types of amblyopia

- **Sensory deprivation** (cataract, ptosis, capillary hemangioma): most difficult to treat
- **Strabismus**
- **Anisometropia** (refractive error differences)

Treatment options:
- Underlying condition
- Glasses
- Patching
- Atropine
Strabismus

- Infantile esotropia
- Accommodative esotropia
- Basic esotropia
- Intermittent exotropia
- Pseudostrabismus
Infantile esotropia

From birth (by 6 months)

Large deviation

Treatment: surgical

Later concerns:

- Latent nystagmus
- Dissociated vertical deviations
- Inferior oblique overaction
Accommodative esotropia

- Significant hyperopia → increased accommodation
- Accommodative convergence and esotropia
- Corrected with full glasses prescription
Basic esotropia

School age

If *acute*, urgent consult

- CNS lesions/ disease
- Look for signs of CN paresis
- May do imaging if clinically indicated
Intermittent exotropia

- Not constant

- Measure the ‘control’
  - How easily child can bring eye back

- Treatment spectrum:
  - Convergence exercises
  - Alternate patching
  - Over-minus glasses
  - Surgery
    - >50% of the day
    - Causing symptoms
    - Impeding visual development
    - Risk of overcorrection → constant ET
Eye muscle surgery

Postop course

- No swimming/head underwater
- Avoid eye rubbing

Meds

- Antibiotics/steroids
Pseudostrabismus

- Corneal light reflexes symmetric
- Epicanthal folds/wide nasal bridge
Capillary hemangioma

Initial rapid growth

Usually involute by age 7

Follow for amblyopia

- Astigmatism
- Deprivation

Tx options

- Propranolol: Vascular clinic
Congenital ptosis

Fatty degeneration of the levator

Poor levator function

Amblyopia
- Astigmatism
- Deprivation

Treatment options
- Risk of exposure keratopathy
- Wait until age 5 if able
Congenital glaucoma

Tearing, blepharospasm, photophobia

Buphthalmos (“cow eye”)

Red eye, hazy cornea
Nasolacrimal duct obstruction

Spontaneously resolve by 10-12 months

Rule out other etiologies of tearing - glaucoma

Probe and irrigate
Congenital cataracts

1 in 5000 live births
- 1/3 inherited
- 1/3 syndrome/infection
- 1/3 idiopathic

Sensory deprivation: dense amblyopia

Treatment
- Surgical
- Nonsurgical
Retinoblastoma

1/15,000

<6 years old

In developed countries, 90-95% survival

<25% have + FHx
Trauma

History: critical step to help illustrate mechanism, forces
Inspect kids carefully…anything is possible
Consider amblyogenic potential
Ruptured globe
Blunt trauma: hyphema

Pain/blurry vision right after trauma

Risk of re-bleed

Risk of glaucoma

Treatment:
- Modified bedrest
- Atropine/steroid drops
- Glaucoma meds prn
Conjunctival/ corneal foreign body
Non-accidental Trauma
Questions?
Thank you!
References


- Images: personal collection, the personal collection of Marlet Bazemore, MD, EyeWiki.org and Google images