CHOC Children’s Business Development
Virtual Pediatric Lecture Series

Vision Screening: Refresher for Primary Care Clinicians

Monday, September 28, 2020 from 12:30 – 1:30 PM (PST)

WELCOME
Vision Screening: Refresher for Primary Care Clinicians

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Objectives

• Development of Vision

• Measurement of Visual Acuity in a Child

• Recognition and Management of Common Pediatric Ocular Disorders
Newborns

• Difficult to arouse
  • Pupillary response
• Visual acuity not fully developed
• Fixation present
Development of Vision

4 Months

• Focus on smaller objects
• Alignment of the eyes becomes stable
• Begins development of depth perception
• Able to look from near to far and back again
Development of Vision

8 Months
• Adult-like clarity
• Good depth perception
• Prefer close, see distant
• Vision = 20/100
• VEP vision = 20/20
Measure of Vision in Infants

**Quantitative**
- Preferential Looking test
- Optokinetic Nystagmus
- Visual Evoked Potential

**Qualitative**
- Fixation and Following
Infants prefer to look at patterned stimuli rather than uniform one
Teller’s Visual Acuity Cards

Cards shown in descending order of graded stripes determine response by child’s behavior to stimuli
Optokinetic Nystagmus

Objects passing across the field of vision producing a pursuit movement followed by a refixation saccade
Visual Evoked Potential

- Scalp electrodes record EEG over occipital cortex
- Stimulus (checks in this picture) are flashed
- Computer extracts stimulus-related EEG signal
When Should Children Have Their Eyes Checked?

• Ocular Symptoms
  ➢ Crossed or misaligned eyes after 4 months
  ➢ White pupil (Leukocoria)
  ➢ Enlarged corneas
  ➢ Persistent tearing or discharge
  ➢ Drooping of the lid (ptosis)
  ➢ Dancing eyes (nystagmus)
  ➢ Unequal pupil or eye size
At Risk Children

• Systemic disease: NF-1, Batten’s Disease
• Family history: High Myopia
• Low birth weight
• Maternal drug use
No Symptoms

When do you have their eyes checked?
AAP Policy Statement

• Children should have an age appropriate assessment for eye problems in the newborn period and then at all subsequent well-child visits

• Early detection and prompt treatment of ocular disorders in children is important to avoid life-long visual impairment
Goal of vision screening is to detect subnormal vision or risk factors that threaten visual development, preferably at a time when treatment can be initiated to yield the highest benefit.
Newborn Evaluation

• Check for External Eye Abnormalities
• Pupil Examination
• Red Reflex Examination
Red Reflex Test

NORMAL

NO REFLEX
(Total Cataract)
Etiology of Cataracts in Childhood

- Inherited
  - Autosomal Dominant
- Metabolic
  - Galactosemia
- Chromosomal
  - Trisomy 21
- Intrauterine Infections
  - TORCH infections
- Trauma
- Steroid Induced
- Renal Diseases
  - Lowe’s, Alport
- Muscular Diseases
  - Myotonic Dystrophy
Pediatric Cataracts

Intrauterine Toxoplasmosis

Down’s Syndrome

Galactosemia (Oil droplet cat.)
Pearls

• Despite best T/t 1/3 rd U/L cataracts have poor visual prognosis
• U/L cataract is challenging: Surgery after 6 weeks of age is less likely to result in good VA
• Early diagnosis and prompt management
• Any doubt about the reflex, immediate referral to Ophthalmologist
Congenital Cataract and its Removal
12-36 Months

- Check for External Eye Abnormalities
- Pupil Examination
- Red Reflex Examination
- Ocular motility assessment
  - Ocular movements in all gazes
  - Cover test
  - Hirschberg test
- Visual Acuity Testing: Photoscreening
Eye Movements in All Gazes
Dissociated Vertical Deviation
Photoscreening
Refer...

- Strabismus
- NLD obstruction
- Horner Syndrome
- Ptosis
- Failed Vision screening
36 months - 5 years

• Check for External Eye Abnormalities
• Pupil Examination
• Red Reflex Examination
• Ocular motility assessment
  - Cover test
  - Hirschberg test
• Visual Acuity Testing (preferred) or Photoscreening
Visual Acuity Referral Guidelines

• 2-3 years: recognize optotypes on 20/50
• 3-4 years: recognize optotypes on 20/40
• Beyond 4 years: Better than 20/40
• VA ≤ 20/40 OU beyond 4 years
• 2-line discrepancy between the eyes.
Strabismus

Misalignment of Visual Axis of one eye relative to other
Strabismus Classification

Direction of misalignment

Esotropia

Exotropia

Hypertropia
Accommodative Esotropia

Underscores the importance of dilated eye exam with retinoscopy in every child with strabismus
Head Tilt from Superior Oblique Palsy
Torticollis from Strabismus
FACE TURN FROM NYSTAGMUS
Strabismus Surgery on Oblique and Recti Muscle
Congenital Third Nerve Palsy
Primary Gaze Alignment POD#7
Decompensated Esotropia and Diplopia
“Excessive Convergence”

Large Angle Esotropia

Excellent Alignment Post-op
Importance of Strabismus

Vision loss may lead to strabismus

CNS lesion may cause strabismus

May result in vision loss due to amblyopia
Amblyopia

• Decrease in BCVA in one or both eyes
• No apparent organic abnormality
• Lack of stimulation of the immature visual pathways
Causes of Amblyopia

Precipitating factors

• Strabismus
• refractive error
• stimulus deprivation
Management of Amblyopia

• Correct precipitating factors
  • i.e. surgery, glasses

• “Stimulate” eye
  • occlude or penalize normal eye

• Treat in first decade of life; ideally as young as possible
Congenital Nasolacrimal Duct Obstruction

Onset within first few weeks of birth

Symptoms
- Epiphora
- Mattering (mucopurulent discharge)
- Rarely conjunctivitis
Treatment of Congenital Dacryostenosis

• Spontaneous resolution occurs in most
• Medical treatment may include topical antibiotics, massage
• Surgical treatment (nasolacrimal duct probing)
  - usually wait until after 1 year of age
• Balloon Dacryoplasty
Criggler’s Massage

**Steps of Massage**
- Trace the inferior orbital rim
- Feel the MCT
- Occlude the inferior canaliculi
- Squeeze towards the second molar
Dacryocystocele
Q&A
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