



Master Class: How to examine a child. . .  
Who doesn't want to be examined

Kathryn M. Haider, MD  
Indiana University



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- I have no financial interests to disclose



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### Objectives

- To review the parts of the eye exam most important to the pediatric ophthalmologist
- To give tips on how to examine a child
- Common/Rare Conditions
- To stay awake!



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### My Goals as a Pediatric Ophthalmologist...

- Assist Normal Visual Development
  - Treat amblyopia
- Keep the eyes healthy
- Avoid vision loss
- Have fun!



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### History: Pediatric Ophthalmologist

- What brings you into see us?
  - “lazy eye” - Ptosis, amblyopia, Strabismus, NLD0
  - Duration? Distance v Near? Percent of day?
- PMH (Short)
  - Prematurity?
  - Any medical conditions?
- FH: “lazy” eye, glasses, patching or surgery as a child



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### Physical Exam: Pediatric Ophthalmology

- Stereopsis
- Vision
  - Fixation preference
  - Nystagmus
- Motility
- Alignment
- CYCLOPLEGIC refraction



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Stereopsis



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Stereopsis

- Depth Perception/3D vision
- Surrogate for near vision
  - Myopic kids do this well
- Helps identify “faking” visual loss
  - 9/9 dots is 20/20 vision
- Protective against amblyopia



Precision Vision



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Stereopsis – Base out fusion

- Use it kids too young for Titmus Fly
- Present object of interest
- Base out prism of 20 PD over one eye
- “look at Goofy’s nose!”
- Watch for conversion

Insert video



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### Stereopsis – Titmus Fly

- Place glasses over their head like a hat
- “Magic glasses”
- “Grab the fly’s wings”
- “Push the animal back”
- “Push the dot back”



Insert video

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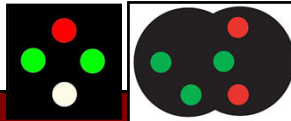
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### Stereopsis – Worth 4 dot

- Test near, then distance
  - Near = Peripheral fusion
  - Distance = Macular/Central fusion
- Place glasses on the child
- “How many dots to you see?”
  - 4 = Fusion
  - 2 or 3 = suppression
  - 5 double vision
  - Any other number = they are playing you.



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### Vision



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**Babies 0-2 months**

- Grimace to light
- While sleeping, move a pen light directly over their eyelid



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**Babies (2 – 9 months)**

- Social smile is KEY
- “Fixation target” – examiner smile/face
- Shift toward silent Social Smile
  - (no auditory clues)
- If possible, check each eye individually
  - Cover an eye
  - move L and R



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**Babies (2 – 9 months)**

- Red Flags:
  - No social smile
  - Visually disinterested
  - Looks “through” you rather than at you
  - Only responds to auditory clues
  - Nystagmus



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### Babies (6 – 18 months)

- “Fix and follow” with both eyes open
- CSM
  - Central, Steady, Maintained
- If possible, check each eye individually
- Tip: Judicious use of sound effects



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### Assess “fix and follow” occluding an eye



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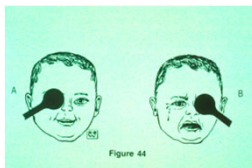
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### Amblyopia – Fixation preference

- Do you like the right eye better? The left eye?
  - Sees equally out of both
  - “Equally mad when covers both eyes”
- Object to occlusion



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### Amblyopia – Forced Prism test

- Forced diplopia – Vertical
- 20 PD Base up prism
- Observe for recognition of second image
- Play “peek-a-boo”



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### Toddlers – The Struggle is Real!

- Age 1.5 – 2.5 = The most challenging ages
- Ask questions
  - Show them a dog and ask if the dog says “quack quack?”
- Move quickly
  - You have about 2 minutes. GO!!!
- Document Honestly
  - “4+ fussy”; “Would not remove face from mom’s body”; “Epic Failure”/“Colossal disaster”



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### Tips for the Toddlers

- Its okay! You win some you lose some
- Amblyopia therapy is effective if initiated before age 5. Your exam doesn't have to be perfect.
- Its okay to document suspicion rather than facts.



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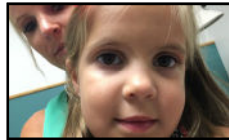
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### Preschool (Age 3-5) - Trick: Warm them up first

- Ask questions with Yes/No answers
  - Have you ever had Ice Cream? Pizza?
  - Consider "stealth" approach
- Show them age-appropriate toys
  - Animal/popular characters (Goofy/Tigger)
- Ask "Silly" questions
  - Does Goofy have buggers in his nose?
- Check motility first, the go onto vision



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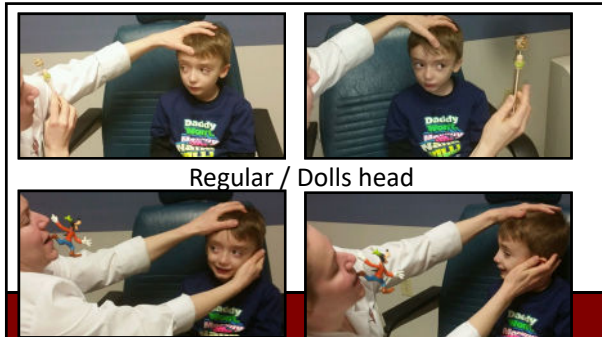
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### Preschool Vision – Optotype Vision

- Key to diagnosing amblyopia
- MATCH!!
- Allen match
  - 60% accurate
- Lea Match/ HOTV crowd match
  - 90% accurate
- Snellen



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### General Tips 2.5 years – 5 years

- Start with both eyes open
  - (to see if they even understand the test)
- 2+ = Allen
  - 60% accurate
- 2.5-3.5+ = HOTV (CROWD)/ LEA
  - 95% accurate
- 3.5-4.5+ : Snellen



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### Allen

- Match or Use words/sound
- Check with both eyes open
- Repeat covering one eye
  - Assuming they used the dominate eye OU...
  - Try to cover the sound eye first
- Follow up vision
  - Check suspected amblyopic eye first
  - TIP: one line difference = amblyopia



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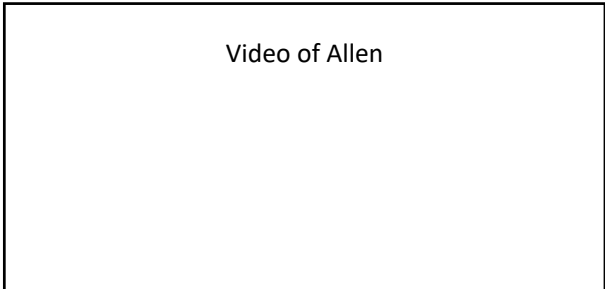
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Video of Allen



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HOTV Crowd

- Check with both eyes open
- WAY more accurate than Allen
- **ALWAYS USE CROWDING BARS**
- Match or use letter names/sounds
  - If they know the letter names, try Snellen
- If previous vision was Allen, repeat vision with Allen testing.
  - Avoid comparing apples to oranges



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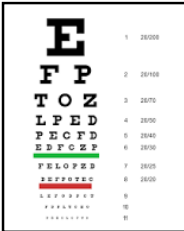
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Snellen

- Check with both eyes open
- Snellen = Gold Standard
- Use letter names/sounds
- If previous test was HOTV, repeat vision with HOTV testing.
  - Avoid comparing apples to orange
  - TIP: Allen 20/30 = HOTV 20/50 = Snellen 20/60



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### Vision Check with Nystagmus

- Check with both eyes open
  - Vision OD/OS = 20/80; Vision OU 20/30
- TIP: Check vision allowing the Anomalous head position/Null
- TIP: Occlude with +8 OD/OS
  - Blurs central vision but minimizes increase in latent nystagmus




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## Motility


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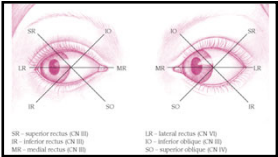
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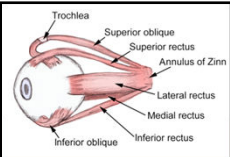
### Motility


- Dolls head
- Versions
- Duction



LR - superior rectus (CN III)  
 UR - inferior rectus (CN III)  
 IO - medial rectus (CN III)

LR - lateral rectus (CN VI)  
 IO - inferior oblique (CN III)  
 IO - superior oblique (CN III)




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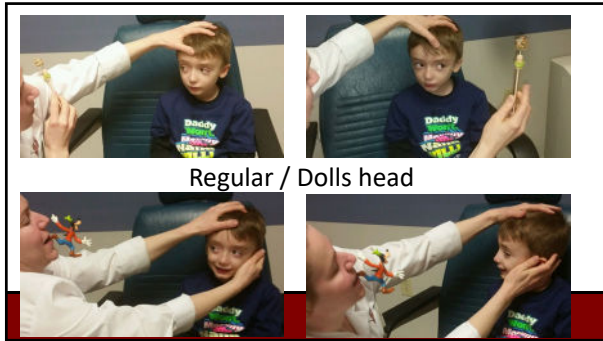
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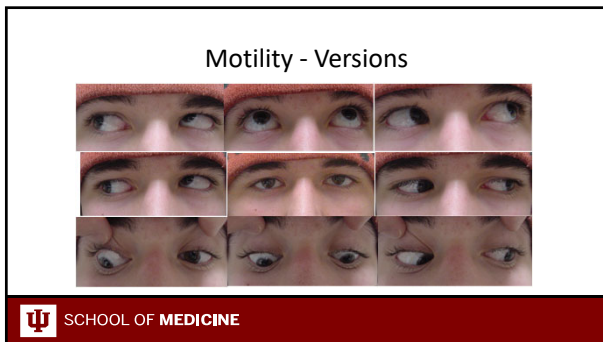
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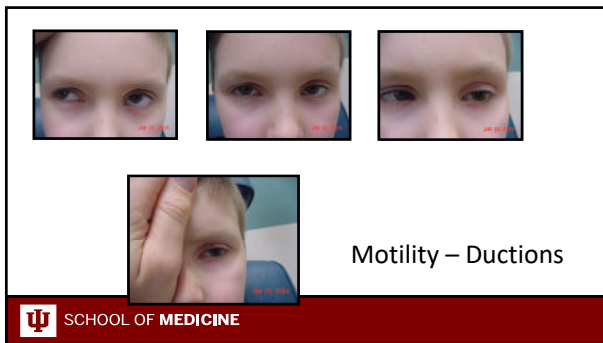
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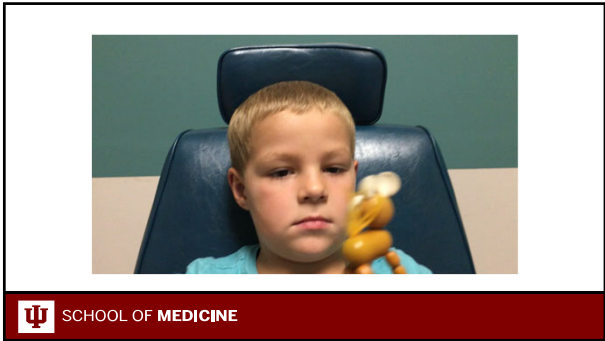
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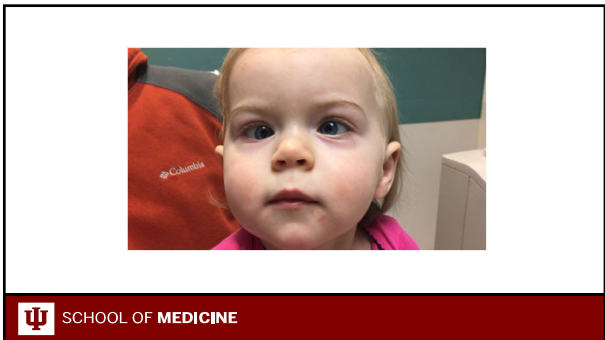
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Alignment



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Alignment

- Exotropia
- Esotropia
- Hypertropia



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- Tips
  - Cover/uncover
  - Cross cover
  - Use prism



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### Bruckners test

- Detects strabismus
- Detects anisometropia
- Detects media opacity



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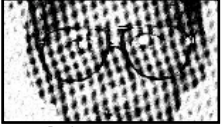
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### Check red reflex



Bruckners



Red reflex

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### Special Case Strategy

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**Special Case**

- ADHD
- Autism
- Develpomental delay

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**ADHD – Not well controlled**

- Personally
  - High energy exam.
  - Distraction is key.
    - Talk a lot to the patient, explain the exam after you are done
  - Move quickly



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**Autism**

- Avoid direct eye contact
- Move slowly
- Follow the cues of their coach
- Bribery!
  - Movie
  - i-pad



Nytimes.com

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### Developmental Delay

- Assess their level of understanding
  - Speak directly to them as much as possible
- Assess their level of participation
  - Matching pictures/letter for vision
  - Tolerate any gaps in participation



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### Refraction

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### Cycloplegic Refraction

- Why is this important?
  - Vision develops between birth and age 8
  - Image needs to focus clearly on the retina to avoid irreversible vision loss (amblyopia)
  - Children have an enormous ability to accommodate
  - Children (occasionally) are not that accurate with making choices
  - Cycloplegic refraction is a measurement



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