Making Examination of the Infant and Young Child Easy

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What Do You Want to Know?

- Can the child see?
- Are the eyes straight?
- Are the eyes equal?
- Are the eyes healthy?
- Is intervention necessary?
- What parent education is necessary?

Getting ready for the examination

- Before the appointment
  - Have parent complete questionnaire
  - What to bring – bottle, treats, pacifier, finger food, favorite toys, security blanket
  - What not to bring – siblings
    (unless accompanied by a designated babysitter)

Getting ready for the examination

- Exam room prep
  - Designated exam room with equipment
  - Procedures for staff to be prepared

Getting ready for the examination

- Equipment
  - Toys for fixation
  - Loose lenses/prisms
  - Hand-held instruments (Panoptic, Tonopen, Bluminator)
  - Non-verbal acuity test
  - Young child stereo test

Communication Tips

- During the examination
  - Be prepared to work quickly, with flexibility
  - Allow cool down period if the baby becomes too fussy
  - Watch the child's reaction to your voice tone & movements
  - Avoid words like "drops" or "hurt"
  - Talk to the baby at their eye level where it is easiest for them
  - Call them by the name Mom & Dad use

Communication Tips

- Parents and siblings
  - Explain to Mom or Dad as you go along
  - Reassure parents when the baby is doing well during the exam
  - Tactfully control the parent's comments
  - Answer questions but don't stop
  - Use parents as targets or as puppet masters to hold the baby's attention during certain procedures

Communication Tips

- Introduction of equipment
  - Laugh when you introduce it
  - Put a toy on it
  - Give it a fun name
  - Play the game with Mom or a toy first if they hesitate
  - Encourage them to touch with each game

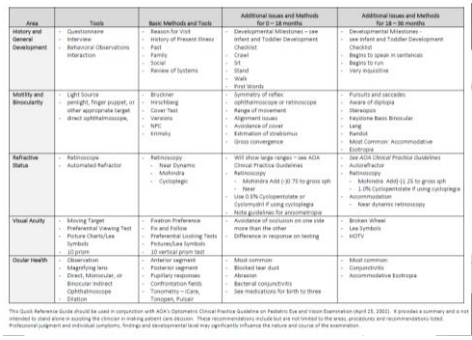
Early Warning Signs?

History

- Expand on pertinent points from parent history
  - Premature or full term
  - Do the parents perceive a problem?
  - Sick a lot
  - Family risk factors
  - Is the child meeting developmental milestones: social, emotional, cognitive

Development

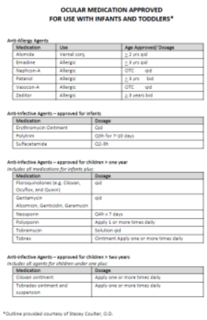
- Developmental milestones for age
  - Need to have general review before going into room
- Look for typical progression within average ranges
- See Chairside Desk Reference



Area	Tools	Basic Methods and Tools	Additional Issues and Methods for 0 – 18 months	Additional Issues and Methods for 18 – 36 months
History and General Development	• Questionnaire • Interview • Behavioral Observations • Interaction	• Reason for Visit • History of Present Illness • Past • Family • Social • Review of Systems	• Developmental Milestones – see Infant and Toddler Development Checklist • Crawl • Sit • Stand • Walk • First Words	• Developmental Milestones – see Infant and Toddler Development Checklist • Begins to speak in sentences • Begins to run • Very inquisitive
Motility and Binocularity	• Light Source • penlight, finger puppet, or other appropriate target • direct ophthalmoscope,	• Bruckner • Hirschberg • Cover Test • Versions • NPC • Krimsky	• Symmetry of reflex • ophthalmoscope or retinoscope • Range of movement • Alignment issues • Avoidance of cover • Estimation of strabismus • Gross convergence	• Pursuits and saccades • Aware of diplopia • Stereopsis • Keystone Basic Binocular • Lang • Randot • Most Common: Accommodative • Esotropia
Refractive Status	• Retinoscope • Automated Refractor	• Retinoscopy • Near Dynamic • Mohindra • Cycloplegic	• Will show large ranges – see AOA Clinical Practice Guidelines • Retinoscopy • Mohindra Add (-)0.75 to gross sph Near • Use 0.5% Cyclopentolate or Cyclomydril if using cycloplegia • Note guidelines for anisometropia	• See AOA Clinical Practice Guidelines • AutoRefractor • Retinoscopy • Mohindra Add (-).25 to gross sph • 1.0% Cyclopentolate if using cycloplegia • Accommodation • Near dynamic retinoscopy
Visual Acuity	• Moving Target • Preferential Viewing Test • Picture Charts/Lea Symbols • 10 prism	• Fixation Preference • Fix and Follow • Preferential Looking Tests • Pictures/Lea Symbols • 10 vertical prism test	• Avoidance of occlusion on one side more than the other • Difference in response on testing	• Broken Wheel • Lea Symbols • HOTV
Ocular Health	• Observation • Magnifying lens • Direct, Monocular, or Binocular Indirect Ophthalmoscope • Stratus	• Anterior segment • Posterior segment • Pupillary responses • Confrontation fields • Tonometry – iCare, Tonopen, Pulsair	• Most common • Blocked tear duct • Abrasion • Bacterial conjunctivitis • See medications for birth to three	• Most common: • Conjunctivitis • Accommodative Esotropia

This Quick Reference Guide should be used in conjunction with AOA's Optometric Clinical Practice Guideline on Pediatric Eye and Vision Examination (April 15, 2002). It provides a summary and is not intended to stand alone in assisting the clinician in making patient care decision. These recommendations include but are not limited to the areas, procedures and recommendations listed. Professional judgment and individual symptoms, findings and developmental level may significantly influence the nature and course of the examination.

Chairside Guide to Infant and Toddler Eye and Vision Examination



OCULAR MEDICATION APPROVED
FOR USE WITH INFANTS AND TODDLERS*

Anti-Allergy Agents

Medication	Use	Age Approved/ Dosage
Alomide	Vernal conj.	≥ 2 yrs qid
Emadine	Allergic	≥ 3 yrs qid
Naphcon-A	Allergic	OTC qid
Patanol	Allergic	≥ 3 yrs bid
Vasocon-A	Allergic	OTC qid
Zaditor	Allergic	≥ 3 years bid

Anti-Infective Agents – approved for infants

Medication	Dosage
Erythromycin Ointment	Qid
Polytrim	Q3h for 7-10 days
Sulfacetamide	Q2-3h

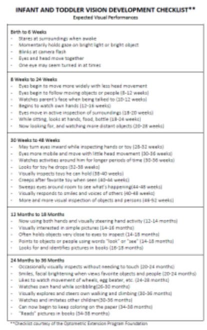
Anti-Infective Agents – approved for children > one year
Includes all medications for infants plus:

Medication	Dosage
Floroquinolones (e.g. Ciloxan, Ocuflox, and Quixin)	qid
Gentamycin Alcomicin, Genticidin, Garamycin	qid
Neosporin	Q4h x 7 days
Polysporin	Apply 1 or more times daily
Tobramycin	Solution qid
Tobrex	Ointment Apply one or more times daily

Anti-Infective Agents – approved for children > two years
Includes all agents for children under one plus:

Medication	Dosage
Ciloxan ointment	Apply one or more times daily
Tobradex ointment and suspension	Apply one or more times daily

*Outline provided courtesy of Stacey Coulter, O.D.



INFANT AND TODDLER VISION DEVELOPMENT CHECKLIST**
Expected Visual Performances

Birth to 6 Weeks
- Stares at surroundings when awake
- Momentarily holds gaze on bright light or bright object
- Blinks at camera flash
- Eyes and head move together
- One eye may seem turned in at times

8 Weeks to 24 Weeks
- Eyes begin to move more widely with less head movement
- Eyes begin to follow moving objects or people (8-12 weeks)
- Watches parent's face when being talked to (10-12 weeks)
- Begins to watch own hands (12-16 weeks)
- Eyes move in active inspection of surroundings (18-20 weeks)
- While sitting, looks at hands, food, bottle (18-24 weeks)
- Now looking for, and watching more distant objects (20-28 weeks)

30 Weeks to 48 Weeks
- May turn eyes inward while inspecting hands or toy (28-32 weeks)
- Eyes more mobile and move with little head movement (30-36 weeks)
- Watches activities around him for longer periods of time (30-36 weeks)
- Looks for toy he drops (32-38 weeks)
- Visually inspects toys he can hold (38-40 weeks)
- Creeps after favorite toy when seen (40-44 weeks)
- Sweeps eyes around room to see what's happening(44-48 weeks)
- Visually responds to smiles and voices of others (40-48 weeks)
- More and more visual inspection of objects and persons (46-52 weeks)

12 Months to 18 Months
- Now using both hands and visually steering hand activity (12-14 months)
- Visually interested in simple pictures (14-16 months)
- Often holds objects very close to eyes to inspect (14-18 months)
- Points to objects or people using words "look" or "see" (14-18 months)
- Looks for and identifies pictures in books (16-18 months)

24 Months to 36 Months
- Occasionally visually inspects without needing to touch (20-24 months)
- Smiles, facial brightening when views favorite objects and people (20-24 months)
- Likes to watch movement of wheels, egg beater, etc. (24-28 months)
- Watches own hand while scribbling(26-30 months)
- Visually explores and steers own walking and climbing (30-36 months)
- Watches and imitates other children(30-36 months)
- Can now begin to keep coloring on the paper (34-38 months)
- "Reads" pictures in books (34-38 months)

**Checklist courtesy of the Optometric Extension Program Foundation

Chairside Guide to Infant and Toddler Eye and Vision Examin-ation

Ocular History

- Previous Rx
- Previous treatment (patching)
- Eye diseases or conditions
- Injuries
- Surgeries
- Other conditions

Testing

Ocular Motility and Alignment

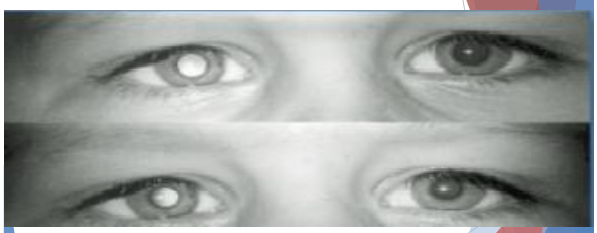
- Fixation
  - Red Finger Peek-a-boo
  - Colorful, Lighted Targets
  - Face-like Targets
  - Silent Visual Targets
- Hirschberg – Binocular evaluation of reflex Angle Kappa
  - Penlight ~50 cm; occlude one eye
  - Estimate reflex displacement (1mm – 22 prism diopters)
  - Krimsky – Prism neutralization of Hirschberg

Ocular Motility and Alignment

- Steele method – Use of retinoscope is most efficient – especially with dark eyes
- Cover test – observation with occlusion (direct or alternate) – loose prism / prism bar

Ocular Motility and Alignment

- Brückner
  - Strabismus, amblyopia, & anisometropia
  - 80 - 100 cm away in dim illumination
  - Ophthalmoscope light on both eyes simultaneously
  - Anisocoria, larger pupil is brighter
  - Anisometropia: higher refractive condition is brighter
  - Strabismus: non-fixating eye brighter
  - Amblyopic eye's pupil will first constrict weakly, then dilate immediately



Bruckner reflex: OD esotropia

Binocularity

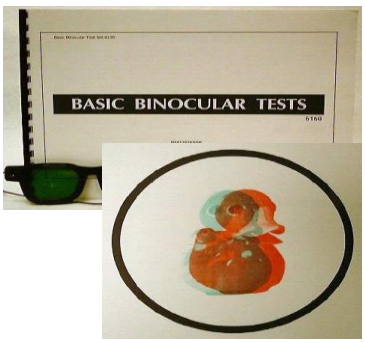
- Based upon stereo acuity development during the first 24 months, the first year represents a sensitive period for development of binocularity
- Stereo testing
  - Lang Randot Stereo test
  - Keystone Basic Binocular Test
  - Can perform beginning around 6 months of age
- Convergence Near Point
  - light up a finger puppet
  - Polished spoon reflection

Lang Randot Stereo test

- no filter glasses required
- STAR everyone should see
- MOON 200”

The Keystone Basic Binocular Test

- Can be used beginning at about six months of age

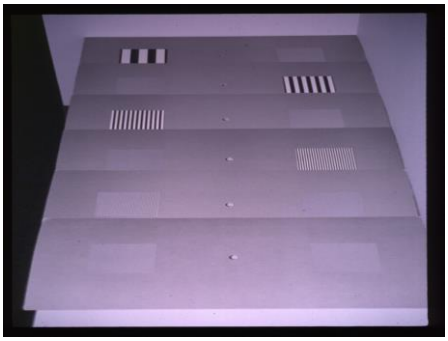


From Bernell Corp

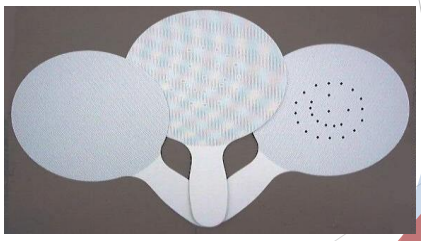
Visual Acuity

- Reaction to occlusion
- Fix – Follow – Maintain
- Fixation Preference with 10Δ BU
  - Alternates fixation equally
  - Holds briefly but one eye dominates
- Preferential Looking/Viewing
  - Teller acuity cards/ Lea gratings or Patti pics/ Richman Face Dot Paddles
  - Best for < 1 year but can be useful with older toddlers
- Cardiff Cards

Teller Cards



Richman Face-Dot Test



Potential Acuity

- Preferential Looking Technique
  - 6 mo 20 / 200
  - 1 yr 20 / 100
  - 2 yrs 20 / 20
- Visual Evoked Potential
  - 6 mo 20 / 20

Risk of Amblyopia development increases with high ametropia, anisometropia or constant unilateral strabismus

Refraction

- Dynamic retinoscopy/Just Look! Retinoscopy
- Mohindra retinoscopy
  - Non-cycloplegic distance assessment
  - Monocular
  - Child fixates retinoscope light
  - Dark room at 50 cm
  - Correction factor: -0.75 D for infants; -1.00 D after age 2 yrs

Refraction

- Cycloplegic retinoscopy
  - 0.5% Cyclopentolate (under 1 year)
  - 1.0% Cyclopentolate (children over 1 year)
  - Spray drops (example)

Ocular Health

- Pupil response
- Visual field screening
  - Use two fixation toys
- Anterior segment & Adnexa
  - IOPs
- Posterior segment

Parent Education

- Educate & Explain
- Each parent has a philosophy of their child and their view of development
- Our responsibility to raise level of awareness
  - Current issues
  - Future issues
  - Concepts of expectations

What do we **Really Want to Know**

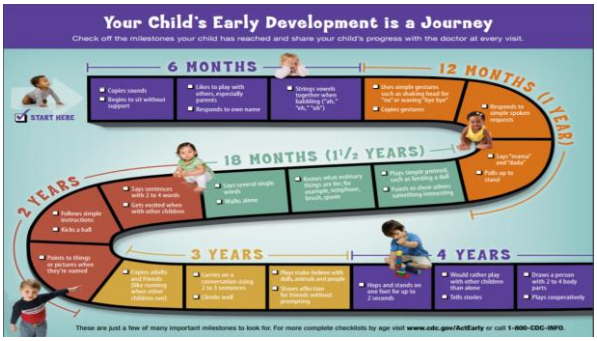
- Does the history suggest a problem?
- Can the baby see?
- Are the eyes straight?
- Are the eyes healthy!
- Is development progressing appropriately?
- Is intervention necessary?
- What parent education is necessary?

Resources

- Patient education
  - AOA
  - COVD
  - OEPF
- Equipment
  - Good-Lite
  - Bernell
  - Gulden Ophthalmics
  - www.slitlamp.com

Equipment List

- Toys
  - Fixation Targets: quiet, noisy, dynamic, large, small, light up, flash
  - Security toys to hold on to
  - Hand puppets/ Finger toys
- Refraction/ Accommodation
  - Retinoscope
  - Trial lenses / Lens bar
  - Cyclomydril (0.2%C&2%P) / 0.5%C / 1%C / Spray caps
- Binocularity/Alignment
  - Transilluminator
  - Loose prisms / Prism bar
  - Lang Randot Stereo test/ Keystone Basic Binocular Test
- Visual Acuity
  - 10 PD loose prism/ Teller acuity cards/ Lea Paddle/ Richman Face/ Cardiff acuity cards
- Ocular health
  - 20 D lens/ Bluminator/ Panoptic ophthalmoscope



Hirshberg

- Hold transilluminator ~50cm aimed at patient's bridge
- If reflexes are symmetrical, no strabismus
- Normal is 0.5mm nasal or central
- If reflexes are asymmetrical, repeat monocularly to determine Angle Kappa
- Displacement: (+) = Nasal
  (-) = Temporal
- 1mm displacement ~ 22 PD

Krimsky

- Use loose prism or prism bar
- Place prism over eye with deviation
- Add prism until light reflex appears to be in same position as other eye

Bruckner Test

- Purpose: To evaluate if there is strabismus (also anisometropia, anisocoria, media opacities, posterior pole abnormalities) in infant/toddlers
- Technique:
  - Hold direct ophthalmoscope ~100 cm in dim room illumination
  - Place light illuminating both undilated pupils at the same time
  - Patient is directed to look at the light
  - Dial in lens power to provide a clear view of patient's eyes and face
- Interpretation:
  - The eye with the brighter reflex* is the strabismic eye (the fundus reflection emanates from outside the pigmented macula region)
  - *assumes equal pupil size, equal refractive error
  - Location of light crescents indicate myopia (inferior), or hyperopia (superior)

Stereopsis Norms by Age

AGE	STEREOPSIS (LOCAL)	STEREOPSIS (RDS-STEREO SMILE)
6-12 MONTHS	+Secondary fusion (Basic Binocular)	+Saccades (Lang)
3-4 YEARS	150 sec of arc	120 sec of arc
4-5 YEARS	70 sec of arc	120 sec of arc
5-6 YEARS	50 sec of arc	60 sec of arc
6-8 YEARS	40 sec of arc	60 sec of arc
11 YEARS OR OLDER	20 sec of arc	60 sec of arc

Vertical Prism Test

- Purpose: A fixation preference test to estimate visual acuity in infants/toddlers. Can detect 3 lines or more difference in acuity.
- Technique:
  - Hold a single 10 PD prism BU or BD front of one eye
  - Hold a fixation target of interest midway between the patient and you
  - Observe eye movements when prism is place over right eye compared to left eye
- Interpretation:
  - Observe if patient moves both eyes down (if prism is BU) or if eyes move up (if prism is BD). This indicates there is absence of suppression and acuities are similar (within 2 lines of each other).
  - An asymmetrical response suggests asymmetrical vision. There is eye movement when prism is placed over one eye, but no change in eye position when placed over other eye.

Infant eye and vision guidelines for normal, concerns, and problems

These are guidelines only

1. **Ocular Motility**
   a. Normal – ability to look at the target, follow and maintain for a brief period or until something else captures the attention
   b. Concern – Reduced ability to gain visual attention in the primary position
   c. Problem - Any limitation of movement in the cardinal meridian
2. **Binocular Function (Cover Test Data)**
   a. Normal – stereo response on gross targets
   b. Concern – no response on stereo targets
   c. Problem – obvious or subtle strabismus
3. **Refraction**
   a. **Hyperopia**
      1. Normal – Less than +3.50 - discuss risk, what to watch for, and usually seen at age 3.
      2. Concern – Between +3.50 and +5.00 - definite need to follow up within 6 to 12 months
      3. Problem – Over +5.00 - establish patient in an optometric office
   b. **Myopia**
      1. Normal - Less than -1.00 - discuss risk, what to watch for, and usually seen at age 3.
      2. Concern – Slightly over -1.00 definite need to follow up within 6 to 12 months
      3. Problem – Well over -1.00 - establish patient in an optometric office
   c. **Astigmatism**
      1. Normal – Less than 2.00 - discuss risk, what to watch for, and usually seen at age 3.
      2. Concern – 2.00 to 3.00 - Definite need to follow up within 6 to 12 months
      3. 3.00 – over 3.00 - Establish patient in an optometric office
   d. **Anisometropia**
      1. Normal – Less than 1.00 - discuss risk, what to watch for, and usually seen at age 3.
      2. Concern – Between 1.00 and 2.00 - definite need to follow up within 6 to 12 months
      3. Problem – Over 2.00 - establish patient in an optometric office
4. **Visual Acuity/Looking Behavior**
   a. Normal – Follows with sustained fixation using both eyes
   b. Concern – Reduced ability to look/fixate
   c. Problem – Fixation preference for one eye or Failed Visual Acuity test
5. **Ocular Health**
   a. Problem – any noted anomaly

Worksheet

Test	Tools	Observation
Visual acuity	10 PD prism, toys, occluder	Fixate and follow, resistance to occlusion, fixation preference
Externals	Penlight, toys	VF, Hirshberg
Binocularity	Lang, Basic Binocular, Direct ophthalmoscope	Fixation, Match, Pincer grasp, Bruckner light reflexes
Refractive status	Retinoscope, loose lenses	Mohindra
Accommodation	Toys, “just look”, loose lenses	Reflex color and motion
Ocular health	20D lens, transilluminator, Bulminator	Shadow test