

# Does My Patient Need Vision Therapy?

Questions to Ask – Tests to do

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 Southern College of Optometry

# Why the Question

- What if all routine tests have been classified by the school screening or other doctors as “normal” and the parent still believes something is amiss?
- Do WE often make the determination of whether vision therapy is needed more complicated?

# Parent’s Comments

- I should have noticed the symptoms earlier
- I wish I would have been more diligent about scheduling eye exams
- I should have kept looking for someone who knew what the problem is
- I should have paid closer attention to my child’s complaints
- I didn’t think I couldn’t afford vision therapy

# What are the Barriers?

- Most children receive eye care screening as a basic assessment within each well-child health exam (Pediatrician, Family Practice or Nurse Practitioner)
- Red reflex and alignment
- EPSDT
  - [\..\..\EPSDT\Six Month.pdf](#)
  - [\..\..\EPSDT\Four year.pdf](#)
  - [\..\..\EPSDT\Recommendations of the Caring for Kids.EPSDT3456.doc](#)

Association of Pediatric Ophthalmologists and Strabismic Surgeons  
**Recommendations for Preventive Pediatric Health Care**  
 Bright Futures/American Academy of Pediatrics

Developmental, behavioral, and chronic disease issues for children and adolescents that require monitoring and treatment only when they are present or when they are suspected to be present. These guidelines are intended to be used in conjunction with the American Academy of Pediatrics' guidelines for well-child care. For complete information on the development of these guidelines, please refer to the full report available at [http://www.brightfutures.org](#).

AGE	INFANCY			EARLY CHILDHOOD				MIDDLE CHILDHOOD				ADOLESCENCE				
	12 mo	18 mo	24 mo	36 mo	48 mo	60 mo	72 mo	9-10 y	11-12 y	13-14 y	15-16 y	17-18 y	19-20 y	21-24 y	25-29 y	
<b>MEASUREMENTS</b>																
Length/Height	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Weight	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Head Circumference	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Height for Length	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Body Mass Index	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Stooped Posture*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>SENSORY SCREENING</b>																
Vision	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hearing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>DEVELOPMENTAL/BEHAVIORAL ASSESSMENT</b>																
Developmental Screening	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Autism Screening	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Psychosocial Behavioral Assessment	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Alcohol and Drug Use Assessment	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>PHYSICAL EXAMINATION*</b>																
Newborn Metabolic/Hemoglobin Screening	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Immunization†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hemoglobin or Hemoglobin A1c Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tuberculin Test	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Dyslipidemia Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
STD Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cervical Dysplasia Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>ORAL HEALTH†</b>																
Anticipatory Guidance	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

\* to be performed; \* risk assessment to be performed, with appropriate action to follow, if positive; ← range during which a service may be provided, with the symbol indicating the preferred age

AGE	INFANCY				EARLY CHILDHOOD				MIDDLE CHILDHOOD							
	12 mo	18 mo	24 mo	36 mo	48 mo	60 mo	72 mo	9-10 y	11-12 y	13-14 y	15-16 y	17-18 y	19-20 y			
<b>HISTORY</b>																
Immunization	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>MEASUREMENTS</b>																
Length/Height	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Weight	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Head Circumference	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Height for Length	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Body Mass Index	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Stooped Posture*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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Hearing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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Immunization†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hemoglobin or Hemoglobin A1c Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tuberculin Test	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Dyslipidemia Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
STD Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cervical Dysplasia Screening†	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>ORAL HEALTH†</b>																
Anticipatory Guidance	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

\* to be performed; \* risk assessment to be performed, with appropriate action to follow, if positive; ← range during which a service may be provided, with the symbol indicating the preferred age

## Recommendations are Confusing

- “Most health plans provide benefit coverage for vision screening; however, payment for vision screening may be inappropriately bundled with the health supervision visit.”
- AAP policy recommends vision screening as part of the regular plan for continuing care beginning at 3 years of age.
- The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of vision screening for children <3 years of age.

## Bottom Line

- Our current system is failing our children – even with the basics
- Kids are not really getting the care they need at any age
- Optometry has solutions for many of the cultural issues facing kids today
- Our job is to help patients meet their expectations
- It must start early in life

## Today’s Child

- It starts early – very early
- Limitation of Movement
- Distractions from learning
- Surfing the net and video games



## Today’s Child

- It starts early – very early
- Limitation of Movement
- Distractions from learning taken to the extreme
- Surfing the net and video games

## Technology

- Santa Claus in Midland, MI
- Kids asking for cellphone, iPad, notebook
- What are the ages of kids sitting on Santa’s lap??

## Technology

- For Hanukkah this year, Maddon Segall asked for iTunes gift cards and the new iPad Mini.
- He is 3.
- “I hate to tell you but we got it for him,” said his mother, Elyse Bender-Segall, of Livingston, N.J. She added: “He doesn’t like the toys. I buy him every toy. He’s just not interested in them the way he is with the tech.”
- “Apps, on the other hand,” she wrote, “are cost-effective, educational and fun — the perfect gift.”
- Babes in a Digital Toyland: Even 3-Year-Olds Get Gadgets By Hilary Stout and [Elizabeth A. Harris](#) Published: December 23, 2013



## Today's Child

- It starts early – very early
- Limitation of Movement
- Distraction from learning
- Surfing the net and video games



MOM SAID GO OUTSIDE AND PLAY...



## Today's Child

- Expectation in the classroom is becoming more complicated – Does our testing need to become more sophisticated?
- Evolution of technology based learning
  - Must have their own personal laptop by fourth grade
  - Principal call concerned that parents were demanding use of iPad in three year kindergarten

## Today's Child

- Not a rant against technology
- Movement is being minimized in early development
  - Decrease in recess time
  - Decreased involvement in sports
  - Decreased time in play/creativity/with others
  - Increased time on technology driven “learning”
- Forced time on obtaining information with too little supervision

## Our Responsibility

- Identify patients at risk of developing vision problems that compromise daily activities and expectations
- Accurately diagnose and manage
- Improve the quality of care rendered to patients with diagnosed conditions
- Minimize the adverse effects of the diagnosed conditions

## Our Responsibility

- Preserve the gains obtained through treatment and guidance
- Inform and educate parents, patients, and other health care practitioners about the visual complications of the diagnosed conditions and the availability of treatment.

• Adapted from language in the AOA CPGs

## Pearls to Guide Evaluation and Care

- Refraction is only one part of vision – look deeper in any patient that has academic problems
- With younger children you have more time
- It's OK to consult with another profession or a colleague

## Where do We Start?

- Good history
- Nearpoint testing – where the action is
- Binocular Vision including accommodation and ocular motility

## Elements of an Examination

- History
- Ocular Motility
- Binocular Function
- Refraction
- Visual Acuity
- Ocular Health

## HISTORY

## Signs and Symptoms

- Some signs and symptoms resolve during the course of development and some do not.
- Each of these signs and symptoms must be carefully monitored to ensure proper and appropriate development.
- For those that do not, early intervention is necessary and important to allow the child to reach full potential.

## Signs and Symptoms

- What about those more subtle signs and symptoms – those not so obvious
- History become so very important
- Must involve the parent and trust the parent
- Match the sign with the symptoms
- If there is not a match, probe deeper with history or with testing

## The Problem

- Too often, parents and other caregivers do not understand the link between vision and the expectations of the classroom
- How much does this bottle of water weigh?
  - Depends more on time than real weight

## What are the Signs and Symptoms?

- There are questions to be asked and tests to do that are very revealing to help make this determination
- COVD Quality of Life Checklist
  - Give to parent to complete – not the patient
  - [..\..\COVD\19 Item COVD-QOL.doc](#)

## What are the Signs and Symptoms?

- CI Checklist – on AOA website
  - Give to parent to complete – not the patient
  - <..\..\CI\PLRG-CI-Card.pdf>
- Additional form(s)
  - <..\..\forms\CONFIDENTIAL CHILDREN.doc>
  - <..\..\ADHD\03VanAssesScaleParent Infor.pdf>

## Evaluating the Responses

- Checklists are a convenient and important means of collecting history information without having to ask the parent every question
- Some doctors do not use checklists because the parent is not always a good historian
  - Verbal versus checklist
- The responses lead you to more specific areas of investigation and to focus in on the areas of risk

## Evaluating the Responses

- Very helpful in directing focus in the examination
- Checklists raise awareness of problems the parent may have never recognized as being related to vision

## Evaluating the Responses

- Reasons why a parent response on a checklist might be high
  - Parent is very involved and in tune with the struggles of the patient
  - Parent wants to make sure a problem is communicated – artificially high

## Evaluating the Responses

- Reasons why a response might be low
  - Parents NOT in tune with the struggles of the patient
  - Parents want to make their child “look good” - protective

## Ocular Motility



## Ocular Motility

- In addition to the routine eye movement testing, monitor the quality of tracking (Maples NSUCO test)
- Observe
  - Head movement
  - Loss of fixation
  - Energy required to maintain fixation
  - Retinoscopy while following

## MAPLES - NSUCO

- Pursuits and Saccades – the one we all do
- Evaluated in four areas
  - Ability
  - Accuracy
  - Head Movement
  - Body Movement

• *NSUCO Oculomotor Test*. Santa Ana, CA: Optometric Extension Program, 1995 – W. C. Maples, O.D.

## MAPLES - NSUCO

- Rated 1-5
  - No attempt (1)
  - Refixation (2)
  - Head movement (3)
  - Body movement (4)
  - Consistent following for two rotations in each direction with no refixation, head movement or body movement (5)

## Scoring for NSUCO Test

PASS SCORES FOR PURSUITS  
(Figure 2)

AGE	ABILITY		ACCURACY		HEAD MVMT		BODY MVMT	
	M	F	M	F	M	F	M	F
5	4	5	2	3	2	3	3	4
6	4	5	2	3	2	3	3	4
7	5	5	3	3	3	3	3	4
8	5	5	3	3	3	3	4	4
9	5	5	3	4	3	3	4	4
10	5	5	4	4	4	4	4	5
11	5	5	4	4	4	4	4	5
12	5	5	4	4	4	4	5	5
13	5	5	4	4	4	4	5	5
>14	5	5	5	4	4	4	5	5

## MAPLES NSUCO

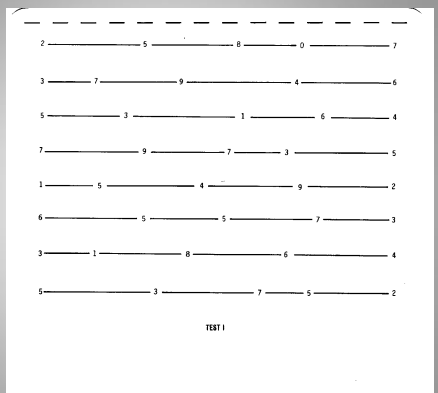
- The **head movement** category for both pursuits and saccades appears to show the greatest difference between good and poor readers

• Maples, Atchley and Ficklin – NSUCO Oculomotor Norms, *Journal of Behavioral Optometry* vol 3 No 6 1992 pp143-150

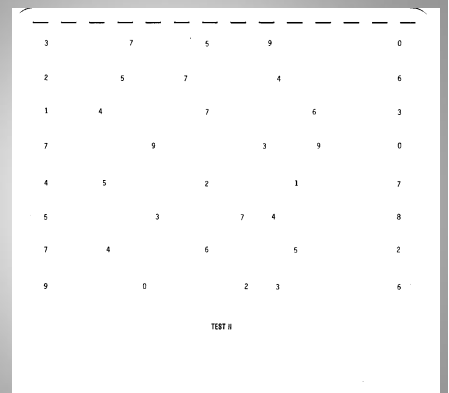
## KING-DEVICK

- Patient timed while reading intermittently spaced numbers horizontally
- Test becomes more complex with each part
- Norm referenced for age
- This test now used also in evaluation of concussion - Devick presented at this meeting

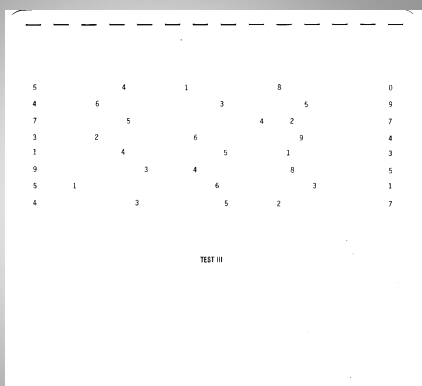
## King-Devick



## King-Devick



## King-Devick



## King Devick Scoring

- <C:\Documents and Settings\gsteel\My Documents\Lectures\KD Scoring.doc>

Developmental Eye Movement Test  
- DEM

- Patient timed while reading vertical and horizontal numbers that are intermittently spaced
- Norm referenced for age
- Good test to determine if automaticity of number recognition is the problem or if it is related to vision

Developmental Eye Movement Test  
- DEM

- Because the DEM incorporates a subtest of naming speed that isolates eye movement skill for a more specific clinical diagnosis, it's use is preferred.

— AOA CPG on Learning Related Vision Problems



**TEST A**

3	4
7	5
5	2
9	1
8	7
2	5
5	3
7	7
4	4
6	8
1	7
4	4
7	6
6	5
3	2
7	9
9	2
3	3
9	6
2	4

DEM

**TEST B**

6	7
3	9
2	3
9	9
1	2
7	1
4	4
6	7
5	6
2	3
5	2
3	5
7	7
4	4
8	6
4	3
5	7
2	5
1	9
7	8

DEM

**TEST C**

3	7	5	9	8
2	5	7	4	6
1	4	7	6	3
7	9	3	9	2
4	5	2	1	7
5	3	7	4	8
7	4	6	5	2
9	2	3	6	4
6	3	9	1	1
7	4	6	5	2
5	3	7	4	8
4	5	2	1	7
7	9	3	9	2
1	4	7	6	3
2	5	7	4	6
3	7	5	9	8

DEM

**DEVELOPMENTAL EYE MOVEMENT (DEM) TEST**  
NORMATIVE

AGE	VERTICAL TIME	HORIZONTAL TIME	ERRORS	RATIO (H/V)
	(seconds)	(seconds)		
	MEAN (S.D.)	MEAN (S.D.)	MEAN (S.D.)	MEAN (S.D.)
6.0-8.11	63.11 (16.59)	98.26 (32.61)	15.22 (11.49)	1.58 (.45)
7.0-7.11	54.83 (9.20)	87.94 (28.18)	12.50 (12.91)	1.60 (.41)
8.0-8.11	46.76 (7.89)	57.73 (12.32)	4.61 (6.91)	1.24 (.18)
9.9.11	42.33 (8.20)	51.13 (13.30)	2.17 (4.10)	1.21 (.19)
10.0-10.11	40.28 (7.43)	47.64 (10.11)	1.91 (2.68)	1.19 (.17)
11.0-11.11	37.14 (5.42)	42.62 (7.63)	1.68 (2.34)	1.15 (.13)
12.0-12.11	35.14 (5.87)	39.35 (8.11)	1.11 (1.17)	1.12 (.10)
13.0-13.11	33.75 (6.53)	37.56 (7.23)	1.61 (2.15)	1.12 (.12)

For Complete Analysis of the Scores Including Standard Scores, Percentiles, Grade Scores, and Case Examples, Please see the DEM Scoring Manual

DEM

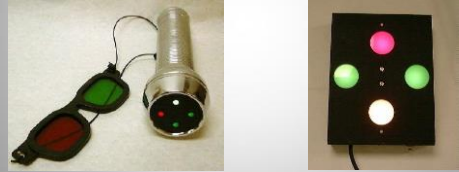
- ## Elements of an Examination
- History
  - Ocular Motility
  - Binocular Function
  - Refraction
  - Visual Acuity
  - Ocular Health

## Binocular Function

## Levels of Fusion

- History
- Worth Four Dot
- Keystone Basic Binocular (KBB)
- Randot
- Phorias/vergences
- 6BI/12BO Flipper

## Worth Four Dot



## The Keystone Basic Binocular Test (KBB)



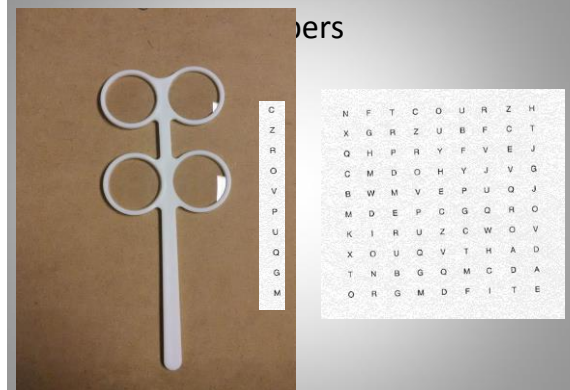
## Phorias and Vergences

- Phorias (expecteds)
  - Far – 0-1 exo
  - Near – 5-7 exo
- Vergences - near (expecteds)
  - Base Out – 21/15
  - Base In – 22/16

## 6 BI/12BO FACILITY

- Expect 12 cycles per minute at school age
- Children in kindergarten are expected to begin major copying from the chalkboard
- “He’s starting Kindergarten in 4 weeks and he does not know all of his letters and he has to begin writing in a journal.”

## Flippers



## Accommodation

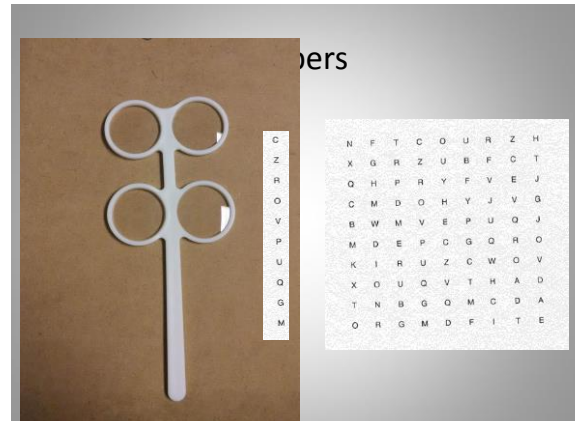
- Push up amp
- PRA/NRA
- +/- 2.00 flippers
  - Expect 12 cycles per minute
  - Monitor with a retinoscope
  - Controls for diplopia and suppression?
  - $\pm 2.00$  Flippers with Polaroid control using Vectogram #9

## Phoropter – PRA/NRA

- Watch for changes in vocal response during the test
- Take blur-out and recovery
- Watch for diplopia on both
  - Eso on minus
  - Exo on plus

## $\pm 2.00$ FLIPPER

- 12 cycles per minute at school age
- Watch for decrease in speed of clearing during the minute
- Watch for suppression on the Bernell #9 slide (polarized lines)



## Refraction and Visual Acuity

## Refraction

- Keep it simple
- Listen to the parent
- If nearpoint or reading complaints, -0.25 is not going to solve the issue and delays intervention
- Have stringent control over accommodation

## Visual Acuity

- With today's insistence on technology, distance visual acuity is not as important
- Be sure to evaluate near visual acuity

## Supplemental Testing

### SUPPLEMENTAL TESTING

- Why is this important?
- History
- All can be performed by a paraoptometric
- Testing can take place while you are engaged elsewhere in the office and your consultation can be done when the para is finished or it can be rescheduled – be consistent

### SUPPLEMENTAL TESTING

- The tests like:
  - Wold Digit Symbol
  - Monroe Visual III
  - Gardner Reversal Frequency
- All of these tests demonstrate the impact of binocular complex of human function and performance

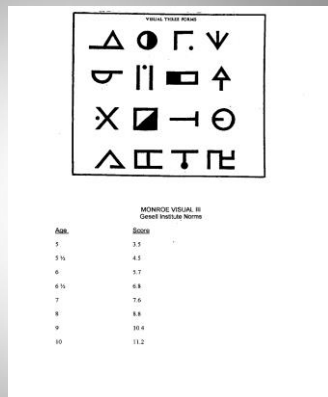
### WOLD DIGIT SYMBOL

- Norm referenced for age
- Simulates copying from the desk or chalkboard
- Watch for changes in posture and body control during testing
- <..\..\forms\Wold DS.doc>

### MONROE VISUAL III

- Short term visual memory
- Look at the four symbols on the line for 10 seconds, then reproduce – repeat for each line
- Norm referenced for age

## Monroe Visual III



## GARDNER REVERSAL FREQUENCY

- Norm referenced reversal test
- Write as called out
- Matching
- Recognition
- Look for patterns of change within the test

## Gardner Reversal Frequency

- <..\..\Development Seminar\Images\Gardner Execution.pdf>
- <..\..\Development Seminar\Images\Gardner Recognition.pdf>
- <..\..\Development Seminar\Images\Gardner Matching.pdf>
- <..\..\Development Seminar\Images\Gardner Instructions and Norms.pdf>

## ASSESSMENT

- Does the patient show disruptions in visual function?
- Is this recent or long-standing?
- Do the patient symptoms relate to your test results?
- How long can they sustain on the task?
- Is this adequate for their needs?

## Decision-making time

- What should be referred?
- What can wait?
  - How long?
  - What to do on follow-up visit
- DON'T WAIT TOO LONG!!
- OR do you just refer anyway?

## Relationship with Consulting Doctor

- Who does the follow-up?
- Who makes the glasses?
- When are they released back to the referring OD?

### T.K.- SUPPLEMENTAL TESTING age 10

- Referred from local OD
- King-Devick 79 secs/68 secs expected
- DEM –
  - V 45/40 average
  - H 51/47 average
- $\pm$  2.00 - Could not clear 20/25 letters
- Wold Digit Symbol – 175/141 secs expected

### T.K.- SUPPLEMENTAL TESTING age 10

- 6BI/12BO –
  - could not clear 20/25 letters
- Reversal Frequency
  - 9/2.07 average
- **Monroe Visual III –**
  - **Score 12/11.2**
  - **Accuracy 79%/74%**

### PLAN – T.K.

- Office Vision Therapy – 24-30 visits
- Emphasis on binocularity complex
- Lenses for nearpoint
- After completion of therapy, the visual findings were at or above the expected for his age
- More importantly, T.K. was able to perform in the classroom at the same level as his peers

### Case – A.A. - Age 4

- Referred from local OD
- VA – 20/20 OD, OS, OU
- FROM
- Refraction - +0.75 OU
- Cover test –  $\emptyset$  far 2 exo at near
- Full stereo at near – reduced at far

### Case – A.A. - Age 4

- Reported that patient periodically closes left eye when points and goes out in the sun
- No other noted problems

### Case – A.A. Age 4

- Significant signs and symptoms for exotropia
- Exotropia usually appear between 4 and 6 years of age
- Guidance activities on a daily basis
- RTC three months



## CASE – KB Age 10

- Referred from local OD
  - VA – 20/20 OD and OS 20/15 OU
  - Phorias – Far 1 exo near 5 exo
  - PRA - -0.25/+0.25
  - NRA - +1.00/+0.50
  - Near Stereo – 2/9

## CASE K.B.

- History
  - Tired eyes at the end of the day
  - In resource in the fourth grade
  - Loses place often when reading – c/o words running together
  - Does well in one on one

## SUPPLEMENTAL TESTING KB

- K-D – 102/68
- DEM
  - V – 75/40
  - H – 61/47 (skips two lines)
- $\pm$  2.00 – could not read 20/25 letters
- 6BI/12BO – could not read 20/25 letters
- Symptoms of “finger diplopia” when reading
- Book Ret – marked with – already had +0.75 from referring doctor

## PLAN K.B.

- Continue +0.75 for all nearpoint activities
- Vision Therapy – 24-30 visits
- On completion of therapy, all tests were within normal expecteds
- More importantly, K.B. was able to perform in the classroom on the same level as his peers

## JRB – Age 10

- Seen in 2009
  - Alternating Esotropia with preference for OD fixation
  - +0.25 on cycloplegic exam
  - Counselor that esotropia due to muscle problem and not accommodative
  - Recommended surgery consult so it would not become constant
  - Not covered on insurance so did not go

## JRB – Age 10

- Returned to SCO in 2014
  - Constant Left Esotropia
  - +0.25 on dry
  - EOM – OS tracks when OD covered
  - VA OD: 20/20 OS: 20/25
  - On Near retinoscopy, JRB comes to alignment with +1.50
  - Maintains 20/20 OU at distance through +1.50

## JRB – Age 10

- What are the issues?
- Not accommodative – determination made from cycloplegia since no near testing done
- TRY LENSES
- Does this patient need VT?

## Summary

- Stop! Look! Listen
- May start with guidance with short follow-up
  - Have a set of guidance activities ready
    - [..\..\Procedures\FTL.doc](#)
    - [..\..\Procedures\VLM.doc](#)
    - [..\..\Procedures\Circle The Letter.doc](#)
    - [..\..\Procedures\HCR.doc](#)

## Summary

- Stop! Look! Listen
- Follow the patient on a more frequent basis
- Develop resources from pool of local ODs
- Above all – ensure the best for the patient

## Contact Information

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