

**Amblyopia Treatment Study (ATS)
Miscellaneous Testing Procedures Manual**

May 3, 2017

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Near Acuity Testing

ATS4 Near Acuity Testing

Description

The ATS4 Near Acuity Test consists of a series of flip cards with single-surrounded HOTV optotypes beginning at 20/400 and ending at 20/20 in 1 logMAR line intervals. A matching card is integrated so that the child can either verbalize a response or point to the surrounded HOTV letter on the matching card.

Specifications

The testing distance is 40 cm (measured with string attached to test).

- If the child cannot reach the matching card that is integrated into the test, to avoid the child leaning in closer than the 40 cm distance to point to the letters, consider placing the laminated HOTV matching card in the child's lap so that he or she may point to the letters on it instead.
- The right eye is tested first with optotype set #1 and then the left eye is tested with optotype set #2.

Procedure

1) Screening phase: Ask patient to identify the first HOTV optotype on each line starting with 20/400 until a letter is missed.

2) Threshold phase: Begin at the lowest correct line on screening, if the patient identifies either 3 of 3 or 3 of 4 correct, continue to test downward until 2 on a line are missed; otherwise test upward until 3 of 3 or 3 of 4 on a line are correct. This line is recorded as the near visual acuity.

Data Form

1. Near visual acuity: OD 20/_____ OS 20/_____	2. Spectacle correction used? <input type="checkbox"/> Yes ₍₁₎ <input type="checkbox"/> No ₍₂₎
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Fixation Preference Testing

Fixation Preference Testing

Description

A test of fixation preference at near. (*Note: For atropine studies, sound eye is cyclopleged for testing*)

Procedure

Induced Tropia Test (for patients with no strabismus or microstrabismus)

1. Present an accommodative target at near fixation. For children less than 7 years use a detailed toy. For children 7 and older, use a grade appropriate reading target.
2. Place a 10-20 Δ base down prism in front of the right eye and observe the fixation pattern.
Right, left or alternates
3. Place the same base down prism over the left eye and observe the fixation pattern.
Right, left or alternates
4. Record whether the child fixed only with the right eye, fixed briefly (1 second or more, but less than freely alternating) with the left eye, alternated fixation equally, fixed briefly (1 second or more, but less than freely alternating) with the right eye, or fixed only with the left eye.

Fixation Preference Test for Strabismic Patients

1. Present an accommodative target at near fixation. For children less than 7 years use a detailed toy. For children 7 and older, use a grade appropriate reading target.
2. Determine which eye is fixing: right, left or alternates
- 3a. Cover the fixating right eye and allow fixation with the left eye.
- 3b. Cover the fixating left eye and allow fixation with the right eye.
4. Remove the cover.
- 5a. Record whether fixation returned immediately to the right eye, fixed briefly with the left eye (1 second or more, but less than freely alternating), alternated fixation equally, remained fixating with the left eye.
- 5b. Record whether fixation returned immediately to the left eye, fixed briefly with the right eye (1 second or more, but less than freely alternating), alternated fixation equally, remained fixating with the right eye.

Data Form

Record for either test:

- Fixation with right eye only (or immediate refixation)
- Prefers right eye, holds fixation 1 second or more with left eye (but does not freely alternate)
- Alternates fixation
- Prefers left eye, holds fixation 1 second or more with right eye (but does not freely alternate)
- Fixation with left eye only (or immediate refixation)

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Binocularity Testing

Titmus Fly

Description

The Titmus fly assesses 3,000 seconds of arc of contour stereoacuity.

Specifications

The testing distance is 40 cm.

Procedure

1. Place Polaroid glasses on child (over spectacles or contact lenses, if worn) before opening the test booklets.
2. Display the fly. Ask the child to pinch the tips of the wings.
3. Record results as positive if child touches above page and as negative if child touches the surface of page.

Data Form

Place Polaroid glasses on child (over spectacles, if worn) before opening the test booklets. The testing distance is 40 cm. Display the fly. Ask the child to pinch the tips of the wings.

1. Titmus Fly: Positive₍₁₎
above page Negative₍₂₎
on surface of page Uninterpretable₍₃₎ Not tested, reason₍₄₎ _____

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Randot Preschool Test

Description

The Preschool Randot test measures random dot stereoacuity from 800 to 40 arc seconds (800, 400, 200, 100, 60, 40).

The Preschool Randot test consists of 3 booklets each with 2 sets of 4 random dot shapes (one is blank, 3 are actual figures), which can be matched to non-stereo shapes on the opposite side of the booklets. There are six levels (seconds of arc) in the test with two levels in each book. Each level has 4 rectangles that contain 3 shapes and one blank.




Specifications

Testing order is Book 3, Book 1, Book 2

Procedure

1. As a pretest, use Book #3 (800"/400").
2. Point to top 4 panels of non-stereo side (black on white shapes) and ask, "Can you point to the duck?"
If the child does not correctly identify the duck, do not proceed with the rest of the test.
3. Starting with Book 3, turn to the Randot side of the test booklet starting with the top level and point to one of the boxes containing a randot shape asking the subject what shape is in the box. The child should be encouraged to match one of the black and white shapes to the Randot shape.
4. Continue by pointing to another shape at the same level. For each shape, indicate whether the patient identified correctly or incorrectly by tapping the image.
5. If 2 shapes are identified correctly at a level, testing will proceed to the next level.
6. If 2 shapes are identified incorrectly at a level, testing will stop at the current level.
7. The final score will be calculated as the lowest level of seconds of arc measured at which 2 shapes were correctly identified.

Data Form

Randot Preschool Stereoacuity Test:		Testing Order: Book 3, Book 1, Book 2				
<i>As a pretest, use BOOK #3 (800"/400"). Point to top 4 panels of non-stereo side (black on white shapes) and ask, "Can you point to the duck?"</i>						
a. Non-stereo pretest: <input type="checkbox"/> Correct <input type="checkbox"/> Incorrect <input type="checkbox"/> Uninterpretable						
If <u>not</u> "Correct", skip the rest of this section.						
<i>There are six levels in the test with two levels in each book. Each level has 4 rectangles that contain 3 shapes and one blank. Starting with Book 3, turn to the Randot side of the test booklet starting with the top level and point to one of the boxes containing a randot shape asking the subject what shape is in the box. The child should be encouraged to match one of the black and white shapes to the Randot shape. Continue by pointing to another shape at the same level. If 2 shapes are identified correctly at a level, check "2 correct" and go to the next level. If child does not identify 2 shapes correctly at a level, check "0 or 1 Correct" and STOP testing.</i>						
b. Test						
	Book 3	Top 4 Panels	800	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
		Bottom 4 Panels	400	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
	Book 1	Top 4 Panels	200	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
		Bottom 4 Panels	100	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
	Book 2	Top 4 Panels	60	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
		Bottom 4 Panels	40	<input type="checkbox"/> 2 Correct	<input type="checkbox"/> 0 or 1 Correct	<input type="checkbox"/> Not Tested
c. Name of Tester _____						

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Worth 4-dot Test

Description

The Worth 4 dot test is used to assess fusion, suppression and diplopia.

Procedure

1. The PEDIG Worth 4-dot glasses (slip ons) should be worn with the green lens over the amblyopic eye and the red lens over the sound eye.
2. Hold the Worth 4-dot flashlight 0.3 m from the child.
3. Ask the child to count or point to the lights that are seen.
4. On the data form, circle the number of lights identified.

Data Form

Place the PEDIG Worth 4 Dot glasses (slip ons) on the child with the green lens over the amblyopic eye and hold a flashlight 0.3m from the child. Ask the child to count the number of lights that are seen

3. Worth 4-dot Test: Circle number of lights identified

5	4	3	2	1	Unable
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Ocular Alignment

Ocular Alignment

Simultaneous Prism Cover Test (SPCT) Measurement

Description

The Simultaneous Prism and Cover Test (SPCT) is used to measure a tropia. The SPCT is performed at both distance and near fixation using an accommodative target (never a fixation light).

Procedure

1. Determine the fixating eye by inspection and/or a cover test.
2. Rapidly and simultaneously, position a cover before the fixating eye and place a prism before the deviating eye.
3. Watch for movement of the non-fixating eye. The cover and prism are quickly removed and the binocular state reestablished.
4. Repeat steps #2 and #3, increasing the power of the prism until a reversal of the movement of the deviating eye is seen i.e. the prism is overcorrecting the deviation. Record the magnitude of prism that either neutralized the deviation or was closest to neutralizing the deviation.

Data Form

Simultaneous Prism Cover Test (SPCT) Measurement

With a cover-uncover test, determine whether a primary position TROPIA (manifest strabismus) is present at distance and near (with spectacle correction).

- *If YES, measure TROPIA with simultaneous prism and cover test (SPCT) and record character/type of tropia (horizontal and vertical) and size in prism diopters (write one number, not a range).*

Definition of Character (click to view)

Constant – *Tropia that is present all of the time during the examination and for which the magnitude of the angle does not appear to vary over the course of an examination.*

Constant Variable - *Tropia that is present all of the time during the examination and for which the magnitude of the angle appears to vary over the course of an examination. If during the course of taking a measurement, the examiner notices that the angle is variable, the character of the strabismus should be recorded as variable and the maximum angle observed should be recorded as the measurement.*

Intermittent – *Tropia which is present some of the time*

1. Distance tropia present? Yes No

If YES,

1a. SPCT: Horizontal size/type: ____ Δ ____

1b. SPCT: Vertical size/type: ____ Δ ____

2. Near tropia present? Yes No

If YES,

2a. SPCT: Horizontal size/type: ____ Δ ____

2b. SPCT: Vertical size/type: ____ Δ ____

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Ocular Alignment

Alternate Prism Cover Test (APCT) Measurement

Description

The APCT is used to measure the full magnitude of a patient's strabismus, which includes the manifest tropia and any underlying phoria. The APCT is performed at both distance and near fixation using an accommodative target (never a fixation light).

Procedure

1. Place an appropriately-oriented prism before one eye.
2. Alternately occlude the eyes with a cover and observe the re-fixation movement of the just-uncovered eye.
3. Gradually increase the amount of prism until the direction of the re-fixation movement of the fellow eye reverses.
4. Reduce the amount of prism until no further re-fixation movement of the fellow eye is seen (i.e., neutralization).
5. Record the magnitude of prism that either neutralized the deviation or was closest to neutralization.

If both SPCT and APCT testing are to be completed, APCT should always be performed after SPCT.

Data Form

Alternate Prism and Cover Test (APCT) Measurement

Regardless of whether the patient exhibits a tropia on cover-uncover testing, measure the size of the deviation with the alternate prism and cover test (APCT), recording the size in prism diopters of the total deviation measured using APCT (write one number, not a range). The maximum angle of the deviation measured should be recorded.

1. APCT with distance fixation:

1a. APCT: Horizontal size/type: ____ Δ ____

1b. APCT: Vertical size/type: ____ Δ ____

2. APCT with near fixation:

2a. APCT: Horizontal size/type: ____ Δ ____

2b. APCT: Vertical size/type: ____ Δ ____

3. If hyperdeviation is present does it have a DVD (dissociated vertical deviation) component?

YES NO

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Ocular Alignment

Modified Krimsky Measurement

Description

The modified Krimsky measurement is used to measure predominant alignment in patients whose visual acuity is too poor to fixate for the Simultaneous Prism and Cover Test (SPCT).

Procedure

1. Use a light at 1/3 meter and place increasing power prism before the fixing eye until the corneal reflex of the amblyopic eye is symmetrical to that of the corneal reflex of the fixating eye (i.e. the location of the reflexes is the same).

Data Form

Modified Krimsky Measurement

If acuity is too poor to fixate with cover testing measure Tropia with Modified Krimsky measurement (use spectacles, if prescribed). Record character/type of tropia(s) (Horizontal and vertical) and size in prism diopters (write one number, not a range).

Definition of Character (click to view)

Constant – Tropia that is present all of the time during the examination and for which the magnitude of the angle does not appear to vary over the course of an examination.

Constant Variable - Tropia that is present all of the time during the examination and for which the magnitude of the angle appears to vary over the course of an examination. If during the course of taking a measurement, the examiner notices that the angle is variable, the character of the strabismus should be recorded as variable and the maximum angle observed should be recorded as the measurement.

Intermittent – Tropia which is present some of the time

1. Near tropia present? Yes No

If YES,

1a. KRIMSKY: Horizontal size/type: ____ Δ ____

1b. KRIMSKY: Vertical size/type: ____ Δ ____

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Eccentric Fixation Assessment

Eccentric Fixation Assessment (Visuoscopy)

Assessment of eccentric fixation should be performed monocularly (fellow eye occluded) with or without dilation, with a direct ophthalmoscope projecting the fixation target onto the retina. It is helpful to first assess the sound eye and to use the result to compare with the result of the amblyopic eye assessment.

Description

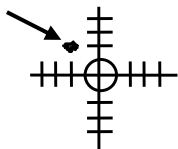
Visuoscopy is used for assessing monocular fixation status. It involves asking the patient to monocularly look at the calibrated target (projected grid) of a direct ophthalmoscope, while the examiner observes the location of the retinal area fixating the projected image of the target. Most direct ophthalmoscopes have appropriate targets that allow the examiner to perform visuoscopy.

Procedure

1. The patient may be dilated for this procedure (procedure easier to perform when patient dilated).
2. Seat patient comfortably and adjust direct ophthalmoscope to calibrated visuoscopy target.
3. Demonstrate the task by projecting the target on your hand or the wall to show the patient the target and explain that he/she will be asked to look at the center (of the circle) of the target. If the patient is a child, ask him/her to point to the center of the target on your hand.
 - Orient the patient and check for reliability by first performing the procedure on the non-amblyopic eye (which should demonstrate central fixation!).
 - Occlude (or patch) the non-amblyopic eye and begin ophthalmoscopy as usual, adjusting the ophthalmoscope lenses so that you are focused on the patient's retina.

Remember the fellow eye should always be covered when performing the procedure.

4. Make sure the target is clearly visible by both the patient and the doctor. It is usually necessary to dim the ophthalmoscope light so the patient can see the target and not be dazzled by the bright light. It is best to confirm (verbally) that the patient can indeed see the target before progressing.
5. Instruct the patient to look in the “center of the target” (i.e., the central circle of the grid) “right now”. At this moment, assess whether the foveal reflex was seen in the center of the circle (central fixation) or outside of the circle (EF). Then move the target slightly and again ask the patient to fixate the center of the target (e.g., “look now”). Repeat 4 times, and each time assess if the foveal reflex is noted to be within the circle when the patient is instructed to look there. If it is central at least 3/4 times, the patient has central fixation. If it is not central at least 3/4 times, then the patient has eccentric fixation (EF).
NOTE: Many individuals will have “unsteady” fixation. Provided that the foveal reflex is consistently seen within the circle when asked “to look now,” fixation is still considered to be central even if fixation drifts after the initial moment of fixation.



(Example of Welch Allyn target. (Circle is 2Δ in diameter and each hash mark is 1Δ.) If this were observed OD, it would be 2Δ nasal and 1Δ of inferior EF. If this were the view when examining OS fixation, it would be 2Δ temporal and 1Δ inferior EF.

Data Form

1. Central fixation in amblyopic eye: **Yes(1)** **No(2)** **Uncertain(3)**

1a. If Yes, indicate whether steady or unsteady:

Steady Unsteady

Note: Sound eye should be occluded when performing visuoscopy on amblyopic eye

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Diplopia Assessment

Diplopia Assessment

Description

The diplopia assessment consists of a demonstration of diplopia with the Diplopia Demonstration Figure, followed by questioning of the patient and parent about occurrence of diplopia.

Specifications

The Diplopia Demonstration Figure consists of two separate pages, one with a set of images on a transparency and one with the same set of images on an opaque background.

Procedure

1. Hold the transparent page in front of the opaque page and move the images to illustrate diplopia (images overlapping and also images completely separated).
2. Ask the patient and parent questions according to the instructions below.

*Demonstrate how "double" vision could look by showing the **PATIENT** the ATS Diplopia Demonstration with the images partially and completely separated, then ask the **PATIENT** the questions below. Mark the answer which comes closest to describing the response.*

1. In the last two weeks, have you ever seen two (double) of the same thing when you were looking directly at it (such as 2 televisions, 2 lines on a page, 2 faces)? Yes₍₁₎ No₍₂₎

If NO, do not ask patient any further questions.

*If YES, ask the **PATIENT** the following questions:*

1a. Have you seen double when you do close activities like reading? Yes₍₁₎ No₍₂₎

1b. Have you seen double when you look at a distance (television, chalkboard)? Yes₍₁₎ No₍₂₎

1c. How often did the double vision happen?

Once a week₍₁₎ Once a day₍₂₎ Up to 10 times a day₍₃₎ More than 10 times a day₍₄₎ All the time₍₅₎

1d. Did the double vision go away when you close or cover one eye? Yes₍₁₎ No₍₂₎ Don't know₍₃₎

*Ask the **PARENT** the following questions (if present): check here if parent not present at visit*

2. IN the last two weeks, has your child ever complained of seeing two (double vision)? Yes₍₁₎ No₍₂₎

If NO, do not ask parent any further questions.

If YES, ask parent the following questions:

2a. Has your child complained of double vision when doing close activities like reading? Yes₍₁₎ No₍₂₎

2b. Has your child complained of double vision when looking at an object or image across a room, like watching TV or looking at the board at school? Yes₍₁₎ No₍₂₎

2c. How often has your child complained of double vision?

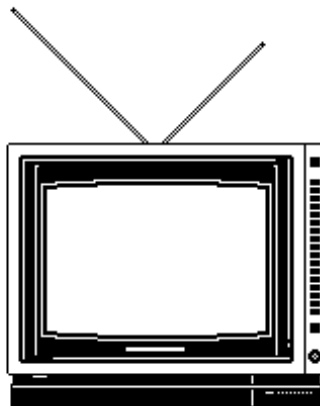
Once a week₍₁₎ Once a day₍₂₎ Up to 10 times a day₍₃₎ More than 10 times a day₍₄₎ All the time₍₅₎

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Appendix F: Diplopia Demonstration Figure



DOUBLE VISION



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Grade-level Reading Assessment

Grade-level Reading Assessment

Description

Grade-level reading assessment is performed to determine whether a child can read grade-appropriate print after cycloplegia of the sound eye.

Procedure

1. Ask the patient to read the appropriate grade-specific print on the Grade-level Reading Card (see back of card for grade levels).
 - Both eyes should be open.
 - Patient may hold grade-specific-print reading card at any distance that he or she finds comfortable.

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Appendix G: Grade-level Reading Card

1 Draw yourself having fun. Make the picture look like a photo.

2 “Cookies!” He ate one, then another. “Cakes!” He ate one, then another. Big Jimmy ate them all. In fact, he was still eating when the clock in the square struck four.

3 Look at your hand. There is a space between your eyes and your hand. But the space is filled with air. Air has volume, too. You can see the volume of air if you blow into a balloon. A balloon gets larger because the air begins to take up space inside the balloon.

4 Once upon a time in America, when automobiles were black and looked like tanks and laundry was white and hung on clotheslines to dry, there were two wonderful baseball leagues.

5 Aunt Laurie decided to start a fabric mail-order business. First, she purchased a list of names and address of people who like to sew. I love to sew. Next, she rented a large room where she could store the fabric and prepare orders. The she bought the fabric from factories. The last thing she did was to prepare a catalog and send it to the people on her mailing list.

6 Everyone has embarrassing moments. They are often hard to forget. Think of an embarrassing moment you’ve had. Remember what caused your embarrassment and how it felt? In small groups, talk about embarrassing moments and what causes them.

Grade	Acuity	Font Size
1 st	20/150	22 pt
2 nd	20/100	18 pt
3 rd	20/80	14 pt
4 th	20/70	13 pt
5 th	20/60	12 pt
6 th and 7 th	20/50	11 pt

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Symptom Survey

SYMPTOM SURVEY

Description:

The child and parent(s) will complete a 5-item symptom survey regarding the presence of various ocular symptoms within the past 2 weeks. The symptom survey must be performed prior to any other testing during the exam.

The symptom survey is a short survey about your observations of your child over the last two weeks. If you are unable to complete this on your own, please ask for someone to assist you.

1. Has your child had headaches?

Never	Almost never	Sometimes	Often	Almost always
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2. Has your child had eyestrain (tired, sore, or uncomfortable eyes)?

Never	Almost never	Sometimes	Often	Almost always
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3. Has your child reported blurry vision?

Never	Almost never	Sometimes	Often	Almost always
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4. Has your child looked over his/her spectacles?

Never	Almost never	Sometimes	Often	Almost always	Not wearing spectacles
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5. Has your child taken his/her spectacles off when he/she should be wearing them?

Never	Almost never	Sometimes	Often	Almost always	Not wearing spectacles
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