HYPEROPIA STUDY PROCEDURES MANUAL

Version 0.4
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Stereoacuity

Randot Preschool Stereotest

Description

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

The Randot Preschool Stereotest has six levels of stereopsis expressed in seconds of arc (800", 400", 200", 100", 60", 40"). Each level has 4 rectangles that contain 3 shapes (created by isolating the images to each eye through Polaroid filters) and one blank. The shapes can be matched to non-stereo shapes on the opposite side of the booklets. There are 2 versions of this test. The older version consists of 3 separate booklets each with 2 two levels of stereopsis in each book/test. The newer version contains all the levels of stereoacuity in a single book.

Required Equipment

- Preschool Randot Test (Books/Tests 1, 2, and 3)
- Polarized glasses

Specifications

- Testing order is Book/Test 3 (800"/400"), Book/Test 1 (200"/100"), Book/Test 2 (60"/40").

Procedure

1. Testing distance is 40 cm.
2. Testing should be done with and without correction according to the protocol.
3. As a pretest, use Book/Test #3 (800"/400").
4. Point to the top 4 panels on the non-stereo side (black on white shapes/pictures) and ask, "Can you point to the duck?" If the child cannot correctly identify the duck, do not proceed with the rest of the test.
5. Starting with Book/Test 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.
6. Continue by pointing to another shape at the same level.
7. If 2 shapes are identified correctly at a level, testing will proceed to the next level.
8. If 2 shapes are identified incorrectly at a level, testing will stop at the current level.
9. The final score will be calculated as the finest level (lowest seconds of arc measured) at which 2 shapes were correctly identified.

An instructional video for certifying administration of the Randot Preschool Stereotest is available on the PEDIG website, filed under Certification Materials > Stereoacuity Testing Certification.

http://publicfiles.jaeb.org/pedig/videos/RandotVideo.avi

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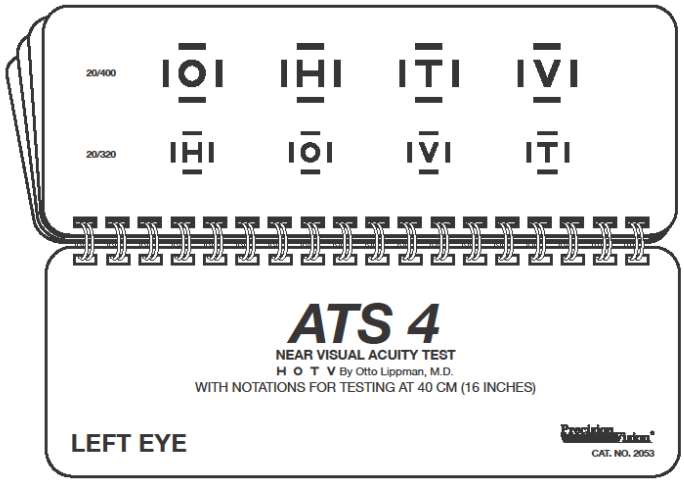
BINOCULAR NEAR ACUITY TESTING

ATS4 Binocular Near Acuity Testing



Description

The ATS4 Near Acuity Test (Precision Vision, Cat No. 2053) consists of a series of flip cards with lines of single-surrounded HOTV optotypes from 20/400 to 20/20 in 1-logMAR line intervals. A matching card is attached so that the child can either verbalize his/her response or point to the HOTV letter on the matching card. The individual administering the test may point to the optotype to be named.

Specifications

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

- If the child cannot reach the attached matching card, place the laminated HOTV matching card in the child's lap so that he or she may point to the letters on it to avoid the child leaning in closer than the 40 cm distance to point to the letters.
- The test is performed binocularly with optotype set #1.

Procedure

Screening phase: Ask the patient to identify the first HOTV optotype at the 20/100 level. The individual administering the test may point to the optotype to be named. If the first letter is correct, the next smallest logMAR optotype size is shown. This process continues through 20/20, asking the patient to identify only the first letter on each acuity level until the patient gives an incorrect response.

Threshold phase: Begin testing 1 acuity level above where the patient gave an incorrect response (i.e., last line with correct optotype identification) during the screening phase. Now ask the patient to identify all 4 letters for that level.

- If the patient identifies either 3 of 3 or 3 of 4 correct, continue to show successively smaller letters until 2 optotypes on a level are missed.
- If the patient was unable to correctly identify at least 3 of 4 correct, test successively larger acuity levels until 3 of 3 or 3 of 4 on a level are correct.

The near visual acuity score is the smallest letter size (line) for which at least 3 presentations (3 of 3 or 3 of 4) are correctly identified.

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Ocular Alignment

Cover-Uncover Test

Description

The cover–uncover test is used to determine whether a tropia is present or not. If a tropia is present, the direction, frequency, and eye laterality are determined. The test is performed first in primary gaze at distance fixation (3 meters) and at near (1/3 meter).

Procedure

1. While the patient looks at an accommodative distance target (fixation animal, detailed picture or similar placed at 3 meters), the examiner covers one eye with an opaque occluder. If possible, older children should be encouraged to read letters at the fixation distance to help ensure accommodation. While covering the eye, the examiner looks for any re-fixational movements of the fellow eye. If the unoccluded eye moves to take up fixation, a manifest deviation (i.e., a tropia) of that eye is present.
    - The occluder should be held in front of the eye, allowing time for re-fixational movements before removing the occluder, after which the occluder is removed to allow binocular viewing conditions.
    - This procedure should be repeated several times to rule out false-positive movements due to poor fixation or inattention.
2. The test is repeated covering the other eye at distance.
    a. If sometimes the left eye is observed to be tropic and sometimes the right eye is observed to be tropic, the tropia is defined as alternating.
3. Testing is repeated for near fixation, using an accommodative target (Turtle fixation stick, #5374, Richmond products, or similar, with sufficient detail to control accommodation).Again, if possible, older children should be encouraged to read letters at the fixation distance to help ensure accommodation.

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 (3 meters) and near fixation (1/3 meter) using an accommodative target (never a fixation light: use a fixation animal, detailed picture or similar placed at 3 meters; Turtle fixation stick, #5374, Richmond products, or similar with sufficient detail to control accommodation at 1/3 meter).

Procedure

1. Determine the fixating eye by inspection and/or a cover-uncover 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 largest magnitude of prism that either neutralized the deviation or was closest to neutralizing the deviation.

Prism and Alternate Cover Test (PACT) Measurement

Description

The PACT is used to measure the full magnitude of a patient's ocular deviation, which includes any manifest tropia and any latent deviation. The PACT is performed at both distance (3 meters) and near fixation (1/3 meters) using an accommodative target (never a fixation light: use a fixation animal, detailed picture or similar placed at 3 meters; Turtle fixation stick, #5374, Richmond products, or similar with sufficient detail to control accommodation at 1/3 meter).

Procedure

1. Place an appropriately-oriented prism in the frontal plane position before one eye.
2. Alternately occlude the eyes with a cover paddle and observe the re-fixation movement of the just-unoccluded eye.
3. Incrementally increase the prism amount until reversal of the deviation is seen. Record the largest magnitude of prism that either neutralized the deviation or was closest to neutralizing the deviation.

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Dynamic Retinoscopy

Monocular Estimation Method (MEM) Retinoscopy

Description

This technique is used to measure the accommodative response to a near target by using lenses to neutralize the motion of the retinoscope reflex.

The near target is placed at the plane of the retinoscope aperture so that both the target and retinoscope aperture are the same distance from the eye so there is no need to correct for the examiner's working distance. The examiner quickly inserts trial lenses at the spectacle plane in order to determine the power of the lens that moves the position of the near point to coincide with the plane of the near target.

Neutrality is observed if the patient is focused at the plane of the near target, with motion is seen if the patient is focused behind the plane of the near target (lag of accommodation or underaccommodation) and against motion is seen if the patient is focused in front of the near target (overaccommodation).

If with motion is seen, plus lenses will be added until neutrality is observed or the neutral point has been bracketed. If against motion is seen, minus lenses will be added until neutrality is observed or the neutral point has been bracketed.

The goal is to quickly estimate the result without leaving the lens or retinoscope beam in place long enough for the patient to change accommodative response or to interfere with binocular vision ($\leq$ 0.3 second).

Required Equipment/Setup

- A retinoscope and the PEDIG accommodative response target (study provided magnetic MEM card with age-appropriate pictures) will be used.
- The testing is performed at a distance of 33cm.
- The test is performed on the each eye (OD followed by OS), under binocular viewing conditions (i.e. with both eyes open).
- Loose lenses or flipper lenses

Procedure

1. The patient is seated comfortably with normal room illumination.
2. The retinoscope is positioned 33cm from the patient, measured from the right lateral orbital rim. This test distance is held constant using a 33cm string attached to the retinoscope.
3. The PEDIG accommodative response target is attached to the head of the retinoscope and the examiner engages the child by asking him/her to look at the target (older children also should be asked questions about the target).
4. The examiner assesses the motion in the horizontal meridian (retinoscope streak vertical) in the right eye.
   a. Record the direction of motion (with motion, against motion, or neutral).
   b. If neutrality (i.e., no movement) is observed, the examiner records 0.00 (i.e. plano) and ends the test.
   c. If any motion is seen without a lens, the examiner will quickly introduce lenses as follows to neutralize the perceived motion.
      i. With motion indicates a lag of accommodation (i.e. under accommodation) and a plus lens should be introduced.
      ii. Against motion indicates a lead of accommodation (i.e. over accommodation) and a minus lens should be introduced.

5. Lenses should be quickly introduced in one diopter increments until a neutral reflex is observed or the neutral point has been bracketed (direction of motion switches from that originally seen, e.g. with motion changes to against motion)
    a. If neutrality (i.e., no movement) is observed with a lens, the examiner records the lens with which neutrality was observed.
    b. If neutrality was bracketed, the examiner should quickly introduce lenses in 0.25D steps between the two bracket lenses until the first, least plus, neutral is observed. That value is then recorded.
    c. It is possible that no lens creates neutrality. For example, with a +0.50D lens "with" motion is observed, and with a +0.75D lens "against" motion is observed. In this situation the MEM finding will be recorded as the value of the closest lens to neutrality. If two lenses, 0.25D apart, are equally close to neutral, the most positive lens should be recorded.
6. Repeat the above procedure to obtain a measurement for the left eye.

Example:

- You see with motion initially.
- You see with motion with +1.00 and against motion with +2.00.
- You see with motion with +1.25., with motion with +1.50, and neutrality with +1.75.
- You should record +1.75.

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