

Contact <u>www.amaoptics.com</u> www. Visionperformance.store 877-744-3937 (EYES)

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Accessories are **required** for

- Stereopsis (Red/Cyan Glasses)
- Visual Acuity (Reading Glass and Occluder)
- Amblyopia (Polarizing Glasses and Screen Filters)

All accessories available at AMA Optics, Inc.

DiagnosticGame App

Download app for IPads, and iPhones,

Apple Store app.





DiagnosticGame® App

- Download Free
- NeuroColor Game Free
- Others are \$1.99/game with 3 repeats

Measures

- 1. Color Vision
- 2. Visual Acuity (E & C)
- 3. Stereopsis
- Relative Afferent Defects Amblyometer[®] & Equalizer[™]

Clinical Data Management

- Record Management HIPAA compliant
- Assign patient # and enter
- Wireless Data Transfer via email
 No paper or USB drives needed
- Automatic archives results

NeuroColor[®] No accessory needed Color vision deficiencies can be hereditary or acquired. Hereditary color vision deficiencies are not progressive and requires no treatment. Acquired vision loss signals a disease and requires an evaluation to discover the cause. Hereditary can often be distinguished from acquired by testing each eye separately, hereditary deficiencies will be the same in both eyes whereas acquired loss is typically different in the two eyes.

If the NeuroColor[®] results are the same for the right and left eyes, hereditary loss is likely, if the codes are different, acquired disease is likely.

Results Codes:

- 1 = Normal,
- 2-4 = Red-Green missed,
- 5,9,13 = Blue-Yellow missed
- 6,7,8,10-12,14-16 =Blue-Yellow and Red-Green missed

Testing Procedure

- Follow prompts and audio of app
- Go to Results to view Normal or Deficiency

Landolt C Visual Acuity

Measures visual acuity using the letter C

Procedure

- Enter Patient's name
- Follow prompts and audio
- Snap-On Reading Glass/Occluder to magnetic polarizing glasses.

Necessary accessories

- 1. Polarizing Glasses
- 2. Right Reading Lens, Left eye occluder
- 3. Left Reading Lens, Right eye s



Vision Self-Test

- 1. Tumbling Es
- 2. Landolt C's

Note. Testing distance is 16 inches and a Reading Lens (+2.5 D) will uncover near sighted subjects and have no effect on others.

Stereopsis

Measures 3D vision

- Put on the Red/Cyan Glasses when prompted
- Follow instructions

Necessary accessory

- 1. Polarizing Glasses
- 2. Snap-On Red/Cyan Glasses



Amblyometer[®] or Equalizer

Measures the Relative Brightness Sense (relative afferent defect)

Setup:

- Mobile device, iPad or iPhone
- Screen polarizing filters
- Polarizing Glasses

Procedure

- Open Amblyometer game or Equalizer
- Subject must understand "brightness": Select: Qualify without wearing polarizing glasses
- Select Play for testing, subject wears polarizing glasses.
- Repeat at least once
- See results Normal: 0.3 log units or less.
- Defect is in the eye with larger log units

Option: proceed to Parity Challenge

Necessary accessories

- 1. Polarizing Glasses (Adult or Child)
- 2. Slide-On Screen Filters



Defect

Parity Challenge

An ingenious technique to detect small relative afferent defects.

Simply test with a denser filter over the right eye and retest with the same denser filter over the left eye. Both test should be of nearly equal {within 0.3 Neutral Density (ND) log units}. In the presence of a defect in one eye, that defect will be amplified nearly doubled. A 0.3 defect will appear as a 0.6 defect.

Normal



Ocular Dominance Columns (ODC) Normal: equal size columns Amblyopia: Representative columns narrow Amblyopia Left eye 0.6 ND



Neutralization of Defect

Ocular Dominance Columns



Parity of Left Challenge

Parity 1.5 ND filter to Right eye (.6 + .9)

Left Challenge = 0.9 ND filter

Left Amblyopia = 0.6 ND



Right Eye Challenge

Left Eye Challenge Add 0.9 ND filter to Left eye Challenge Challenge Left Right Challenge of 0.9 ND 67/0 Left Challenge of 0.9 ND Optic (II) nen Left Ontic (Uncrossed axon tic (II) ne 0.6 Defect Crossed axon LEFT Optic tract Uncrossed avor 0.6 Defect Crossed axon LEFT Left Amblyopia of 0.6 ND Defe Left Amblyopia of 0.6 ND Defect Left brain ODC Primary visual areas in occipital lobes of cerebral cortex Primary visual areas ODC Ocular Dominance Columns in occipital lobes of carebral cortex



Parity Challenge Summation

Parity of Left 0.9 Challenge = 1.5 units Parity of Right 0.9 Challenge = 0.3 units Difference = 1.2 units

Doubles the 0.6 ND Amblyopic DEFECT!

Academic Notes

Diagram of Hofeldt Bridge[®]



The Methodology for the Amblyometer and the Equalizer are based upon the Hofeldt Bridge[®]



- The Wheatstone bridge circuit is shown above. It can be used to find the resistance of a unknown resistor, very precise, invented in 1833.
- The variable resistor, R_x, is adjusted until the galvanometer reads zero volts. At this point the two sides of the bridge are balanced.
- When balance: $R_1 / R_2 = R_3 / R_x$.
- If the bridge is put out of balance by altering the resistance of one of the resistors, the galvanometer reading will not be zero.

Both Wheatstone and Hofeldt Bridges bridge two channels



- The Hofeldt bridge circuit is shown above. It can be used to balance a brightness defect in the visual system, very precise, invented in 2011.
- The variable right or left eye brightness is adjusted until the Top and Bottom fused images appear of equal brightness. At this point the two sides of the bridge are balanced.
- When balance: $L_B / R_D = R_B / L_D$.
- If the bridge is put out of balance by altering the brightness in one eye, the other eye is dimmed until the Top and Bottom fused images appear identical, 0 brightness disparity.

US Patent 9560960 B2

Amblyometer for balancing bridging rivalrous binocular vision