

Magnetic Farnsworth D-15 and Magnetic L'Anthony Test Instructions

Rev 1.1 (02/03)

Introduction

Magnetic Farnsworth D15 and L'Anthony Dichotomous Tests For Congenital and Acquired Color Vision Defects

16 Color Discs, developed in the 1940's

The D15 set is a modification of the well-known Farnsworth-Munsell 100 Hue Test. The D15 test is intended for classification instead of more time-consuming in-depth study of color vision defects using the 100-Hue test. Each D15 set contains a reference disc and fifteen numbered discs, which make up an incomplete color circle. Following an attempt to sequentially arrange the discs by the patient, evaluation determines color perception or defects in deutan, protan or tritan axis discrimination. Sometimes there are indeterminate defects in the cases of retinal toxicity.

The Farnsworth D-15 test is called 'dichotomous' because it was designed to separate subjects into one of two groups: 1.) Strongly/Medium color deficient or 2.) Mildly color deficient or color normal. This is accomplished by the arrangement of vivid (saturated) colored discs. This makes the test fairly easy and a non-perfect score is indicative of a strong color deficiency.

The L'Anthony D-15 test was designed to separate patients into one of two groups: 1.) Mildly color deficient or 2.) Normal color perception. This is accomplished by the arrangement of faded (unsaturated) colored discs. This makes the test fairly difficult and a non-perfect score is indicative of a mild color deficiency. The L'Anthony test is considered more appropriate for use in the detection of acquired color defects. This test is not appropriate for patients who have already failed the Farnsworth D15 test.

Note: The administration of the test and the score sheet template are identical for the Farnsworth D15 and the L'Anthony D15 tests. The only difference between these items is the color saturation of the discs.

Magnetic Versions:

We have developed the Magnetic Farnsworth and Magnetic L'Anthony packaging in order to eliminate errors due to smudged or damaged discs. Because the Magnetic versions are sealed, they also prevent loss of chips. The Magnetic version makes the test seem more like a game for pediatric applications thus improving the performance of a younger aged patient.

Contents

Each Richmond Products Magnetic Farnsworth D-15 or Magnetic L'Anthony D15 set consists of:

- Sealed Acrylic Box which includes:
 - Reference Disc (disc is identified with white dot on top)
 - Fifteen colored discs (numbered on the bottom)
 - Abrasive resistant clear top
- Magnetic Farnsworth Instructions
- Score Sheet Template (laminated)
- Magnetic pen (ships stored in small pouch on protective bag)
- Protective storage bag (Black)

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Storage and Care

The Magnetic Farnsworth and Magnetic L'Anthony tests should be stored in its protective storage pouch in a cool dry place since exposure to light will affect the color discs. Be sure to secure the Magnetic Pen to avoid loss.

Do not immerse. To clean the Abrasive Resistant clear top use glass cleaner sparingly and a soft cloth. Do not use any paper products.

Test Environment Lighting

The test is intended to be administered on a black background to prevent surroundings from affecting the color perception by the patient. Further, it is very important to administer these tests under consistent conditions so that each subsequent retest over time can be judged properly. The illumination should provide approximately 6700°Kelvin at 25 foot-candles or greater (Illuminant C) or daylight. Richmond Daylight Illuminator (P/N 1339R) provides acceptable illumination. See www.RichmondProducts.com for more information.

Pre-test Considerations

The examiner must determine if the test will be accomplished using binocular vision or separately for each eye. Testing for congenital color defects is usually accomplished binocularly because monocular genetic variations are very rare.

Testing for acquired defects (drug toxicity, trauma, retinal disease, etc.) are usually administered on each eye separately. This is especially warranted with a patient history of trauma or a drug regimen (such as Plaquinil or Myambutol) affecting color vision.

After determination of the test method in terms of binocular or monocular, the score sheet should be marked accordingly. The examiner should also determine the approximate time the patient will be permitted for the test. Children over the age from the age of 4 have been able to perform the magnetic version of the tests adequately.

The magnetic versions of the tests were designed to be performed by patients with limited dexterity. In some cases, patients with more severe dexterity limitations may require the examiner to move each color disc in the order selected by patient as the test is being administered.

The Magnetic Farnsworth D-15 and Magnetic L'Anthony D15 tests are not sensitive to mild to moderate visual acuity loss. The tests are engineered to be conducted at a working distance of 19.5 inches (50 cm).

For low vision patients, a Farnsworth D-15 set with color discs that are almost three times in size is available from Richmond Products (P/N 32601) and is called the Large Stimulus Pediatric Farnsworth Equivalent.

Prior to testing, make a copy of the score sheet and complete the patient data sections. The examiner should also decide if the patient will be permitted to change selections once they are made. Some traditional instructions suggest that the patient should not be permitted. Some examiners permit limited changes in selections but gross indecision is often an indicator of color deficiency.

Testing Procedure

Remove the box from its protective storage pouch. Lay the pouch out flat and use it as a black background surface. Holding test with disc colors facing up and tilt the box to move all the discs 1-15 and the reference disc into the corral area of test box (see diagram). Tilt the box to insure that the 16 discs are mixed up and separated from each other somewhat.

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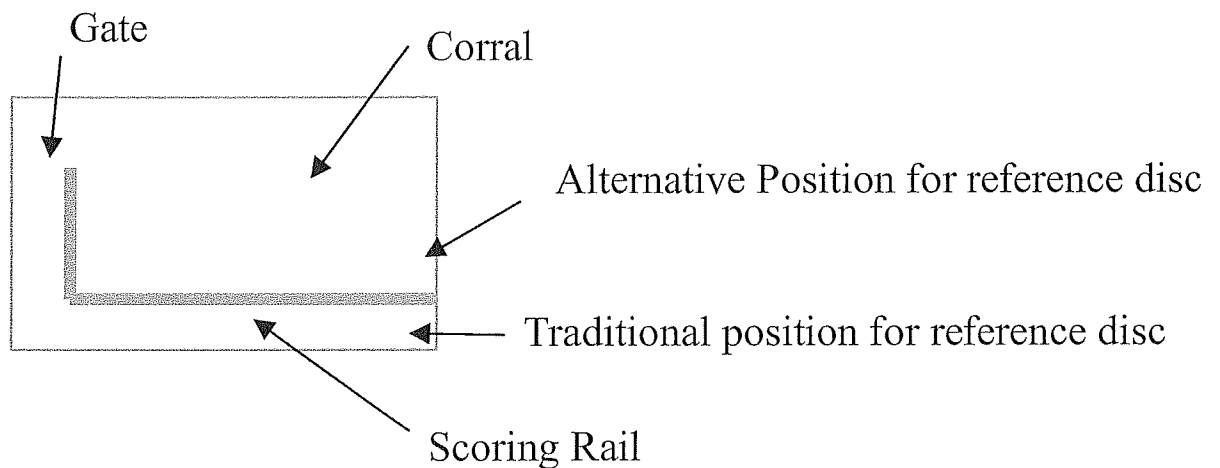
The examiner can now demonstrate how the magnetic wand is used to move the chips. The examiner should select the reference disc (with the white dot) and move the reference disc to the starting position. The examiner has a choice of two starting positions for the reference disc.

If the patient will NOT be permitted to change selections, the reference disc should be placed at the extreme right hand side of the scoring rail. In this case, the patient positions their selections to be adjacent to the reference disc by moving the discs into the scoring gate. Also, positioning the discs in the scoring gate area permits scoring without having the patient complete the test.

If the patient will be permitted to make changes, the examiner may want to position the reference disc in the lower right hand side of the corral. In this case, the patient positions their selections to the right of the reference disc along the rail. If this option is selected, care must be taken when the examiner flips the box over for scoring as the discs are loose within the corral area. Also, positioning the discs outside the scoring gate area means that the patient must complete the test in order to avoid contamination of the selected sequence when tipping the box up for scoring.

Set test box on the black pouch in front of patient. For younger patients, you may want to let them practice moving the color discs using the Magnetic Pen to give them familiarity with the technique.

When they are ready, instruct the patient to select the color disc which most closely matches the reference disc. Have the patient position their selection adjacent to the reference disc.



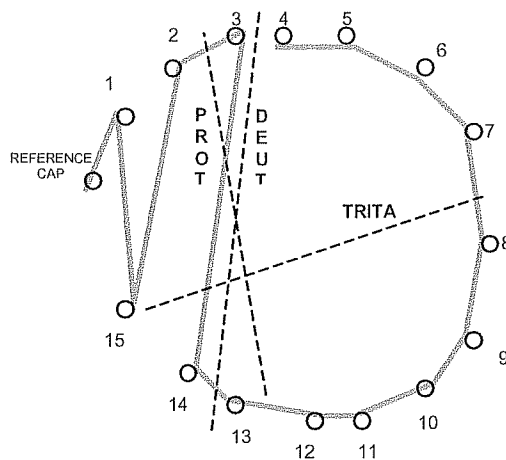
The patient then continues to select the next closest color disc sliding each disc into place next to previously selected disc until all discs have been selected. The patient should be given a reasonable time to arrange the discs and may be permitted to alter the sequence prior to completion; however, the total test time should be about 2 minutes and should not be unlimited.

Scoring

The Scoring method for the Magnetic Farnsworth or Magnetic L'Anthony tests is the same as the non-magnetic versions.

Scoring is accomplished by reading the color chip numbers on the reverse side through the clear plastic bottom and recording the sequence of discs selected by the patient on a copy of the score sheet. A patient with a color vision deficiency will arrange the color discs in a different order than a person with normal color vision.

The patient's selection of the discs is then diagrammed on a copy of the score sheet template. For example, if the patient's selection order was Reference cap, 1, 15, 2, 3, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4 the scoring would look like this:



A line is then drawn from the starting point (Reference disc which is blank on the bottom) through the sequence determined by the patient. If the lines remain along the outside of the circle (few discs out of order) then the patient is deemed to be 'normal' or very mildly color deficient. If the sequence lines cross the center repeatedly, the patient has a medium or strong defect. The type of defect is determined by comparing these crossover lines to see if they are parallel to the protan, deutan or tritan color confusion axes (see below). Confusions occurring regularly in a certain direction across the score sheet reveal the type of color defect. See figures below.

Confusions among color discs that are close together are not considered significant. Some examiners consider that one or two crossings are normal. Some examiners consider confusion crossing from color disc # 7 to #15 to be insignificant as these are so close in hue; however, if the line from # 15 does not remain along the outside edge of the circle, a defect in the blue/yellow axis should be suspected.

With the Farnsworth test, the difference between mild and medium defect is not easily defined. The difference between medium and strong deficiency is often considered at 10 crossings.

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See samples below.

Figure 1 Normal or near Normal

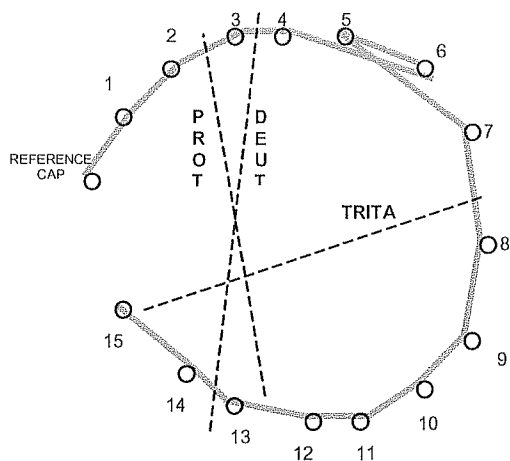


Figure 2 Near Normal or Mild Deutan

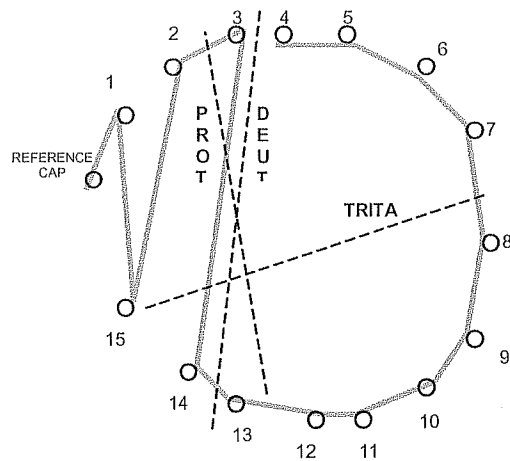


Figure 3 Medium Deutan

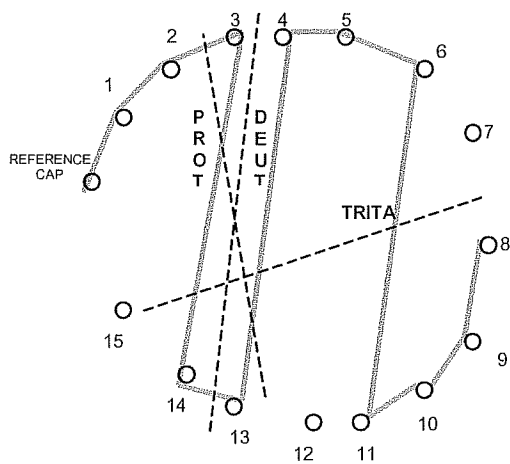
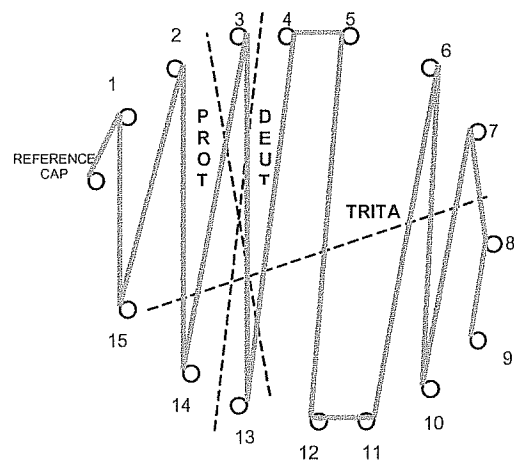


Figure 4 Strong Deutan



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Figure 5 Strong Protan

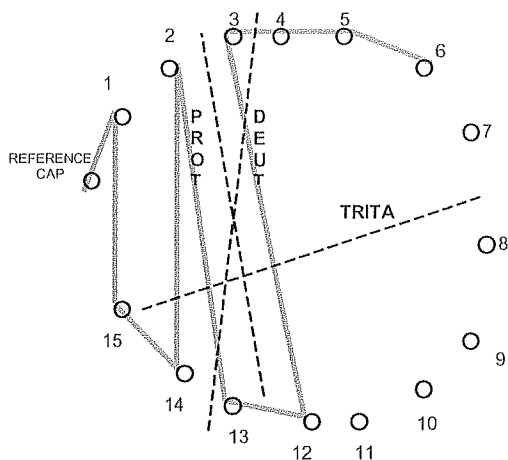
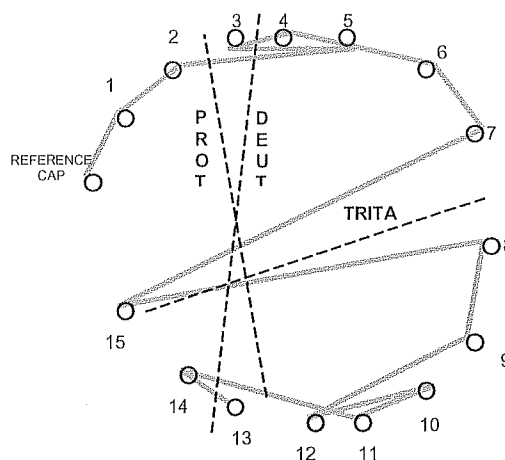


Figure 6 Tritan



Retesting

Any score achieved that is less than normal should trigger a rest for the patient. Then review the instructions with the patient again to be sure that the test procedure was fully understood. Record the retest on a second score sheet appropriately marked.

Interpretation

A 'confusion axis' is a localized area on a color plot where a patient with less than normal color perception cannot adequately determine one color from another.

Deutanomaly is the most common type of color vision deficiency affecting especially the green receptors. A deuteranomalous patient will have trouble distinguishing blue-green from gray and red-purple.

Protanomaly is a color vision deficiency affecting especially the red receptors. A protanomalous patient will have trouble distinguishing red-green and confuses red-orange with blue-green and gray.

Tritanomaly affects especially the blue receptors. He or she will confuse violet with gray and yellow-green. A tritanomaly is rarely inherited. Recent studies have shown increases in this type of defect due to adult acquired color deficiency, often from medications.

Deutan subjects exhibit a 'confusion axis' from green to purple. Protans have a 'confusion axis' from red to blue-green. Tritans show a 'confusion axis' from yellow to blue. These 'confusion axes' represents a region on a color wheel (similar in layout to the score sheet) where the patient has problems discriminating among closely related colors. These axes divide the color wheel into two sections. Since the Farnsworth test distinguishes between two groups; i.e. those with normal or mild deficiency Vs those with medium or strong color deficiency, the test is called 'dichotomous'. The L'Anthony de-saturated test is often used for those who have passed the Farnsworth D15 to distinguish between mild color deficiency and normal. It is more difficult for the patient to perform accurately.

Consultation of a textbook on this subject is suggested for additional clarification.

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Replacement Parts:

Replacement parts can be ordered from Richmond Products as follows. Price may change without notice. Check our web site at www.RichmondProducts.com for the latest prices and ordering information. Items sold FOB Boca Raton, FL.

P/N 4428B Laminated Farnsworth D15 or L'Anthony score card \$ 9.50 each
P/N 4532 Magnetic Farnsworth or Magnetic L'Anthony instructions
on paper \$ 10.00 each
P/N 4530 Magnetic Farnsworth D15 Black Protective Storage Pouch \$ 20.50 each
P/N 4529 Magnetic Pen \$10.00

P/N 4531 Replacement Box - This is a service to reseal a set of discs into a new box - \$ 110.00

The 4531 service can be used to replace a damaged or broken box. The service includes: a new box and a replacement reference disc. This service requires return of the damaged Magnetic unit with discs in undamaged condition. Do not send the magnetic pen, instructions or pouch. Any other lost or damaged discs will be charged at the then current rate for color discs. Return postage to Richmond must be pre-paid. Ship to: Richmond Products 1021 So Rogers Circle #6 Boca Raton, FL 33487. Shipping cost back to the customer will be added to invoice.

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