D-15 Color Test Guide

Part Number: 730022, 730023

Farnsworth D15 Color Test - **730022**

Lanthony Desaturated Color test - **730023**

Farnsworth D15 and Lanthony 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 Lanthony D-15 test was designed to separate patients into one of two groups: 1.) 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 Lanthony 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 Lanthony D15 tests. The only difference between these items is the color saturation of the discs.

Contents

Each Good-Lite Farnsworth D-15 or Lanthony D15 set consists of:

- Reference Disc (0)
- Fifteen colored discs (numbered on the bottom)
- Clear ABS Plastic Case (with top)
- Guide
- Score Sheet Template

Storage

The Farnsworth and Lanthony tests should be stored in a cool dry place. Since exposure to light will affect the color discs, the set should be kept wrapped in the shipping container or other provision to protect from light.

Precautions

Each color disc is mounted without any protection of the color sample to insure correlation to other color tests. Consequently, it is very important to insure that no one touches the color sample to avoid the damage of fingerprints. This is the reason that it is very important that the examiner and the patient wear some sort of protection of the fingertips. Powder free non-latex gloves are furnished for this purpose.

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 6700º Kelvin at 25 foot-candles or greater (Illuminant C) or daylight. Good-Lite Color Test Daylight Illuminator (P/N 612600) provides the recommended illumination for optimum test results.

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Pre-test Considerations

The examiner must determine if the test will be accomplished using binocular vision or separately for each eye. Monocular variations are very rare, however history of trauma or other considerations may warrant one method over the other. Testing for congenital color defects is usually accomplished binocularly. Testing for acquired defects (toxicity, trauma, retinal disease, etc.) is usually administered on each eye separately.

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 of 5 often can perform the test adequately.

For patients with limited dexterity, the procedure indicated where each color disc selection is placed in the Clear box may be altered with the patient requested to show each selection to the examiner for 'line-up' by the examiner. It is important that the patient be able to view the 'line-up' as it builds for review.

The Farnsworth D-15 and Lanthony 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, there are two alternative selections which may help. The first is a Magnetic Farnsworth test which uses a sealed box to avoid contamination of the discs. Discs are moved as in a game by a magnetic wand. Another alternative is a Farnsworth D-15 set with color discs that are almost three times in size is available from Good-Lite (P/N 260200) called Panel 16 Quantitative Color Vision Test.

Testing Procedure

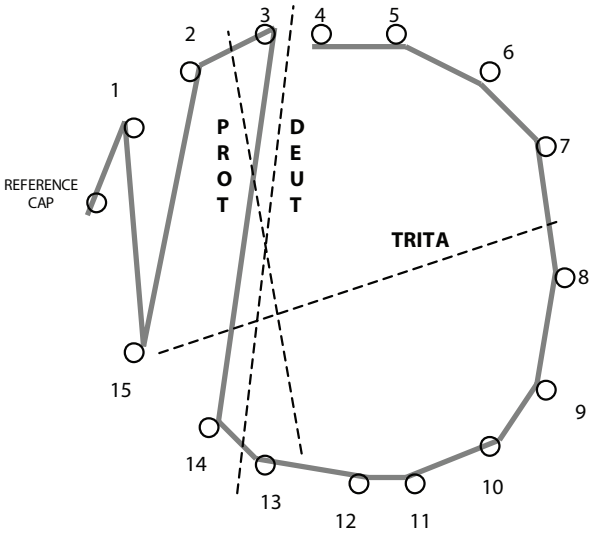
To open the ABS clear plastic box, press the circular label in the center of the top and lift up one end. Keeping the top and bottom together (but still open) tip the color discs into the top so they are upside down. Now tip the top (with the discs) onto the surface selected for the test. It is recommended that the surface be black in color. The examiner then selects the reference cap (the color disc with blank notation underside) and places that cap into the box bottom, to one end. Wearing gloves, the patient is then ordered to select the color disc, which most closely matches the reference cap and place in the bottom of the box and slide next to the reference cap.

The patient then continues to select the next closest color disc and places each in sequence in the bottom of the box. 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 time should be about 2 minutes and should not be unlimited. At the completion of the test, the examiner should slide the lid into place to secure the test chips.

Scoring

Scoring is accomplished by reading the color chip numbers on the reverse side through the clear ABS box and recording the sequence 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 diagramed 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 chips 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.

See samples below.

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Figure 1 Normal or near Normal

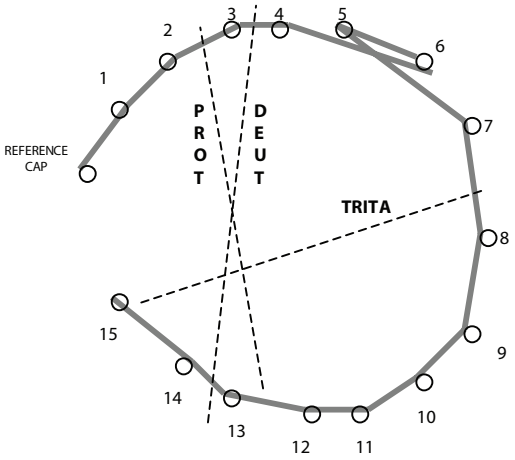


Figure 2 Near Normal or Mild Deutan

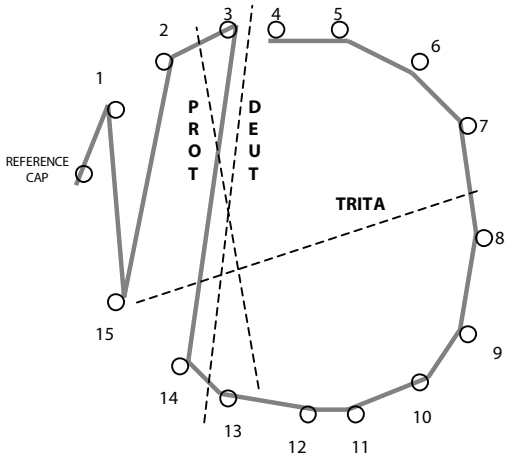


Figure 3 Medium Deutan

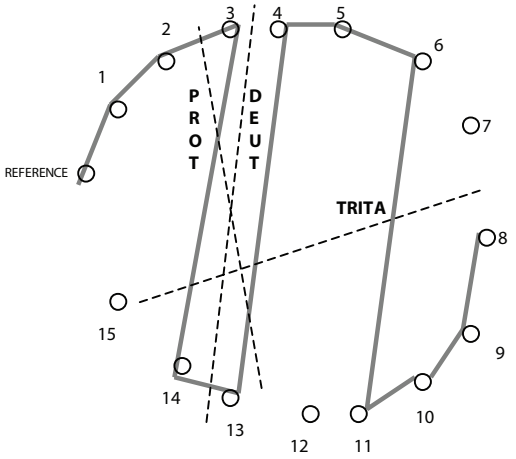


Figure 4 Strong Deutan

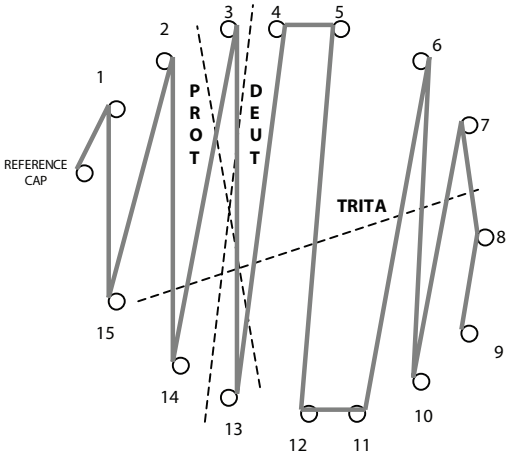


Figure 5 Strong Protan

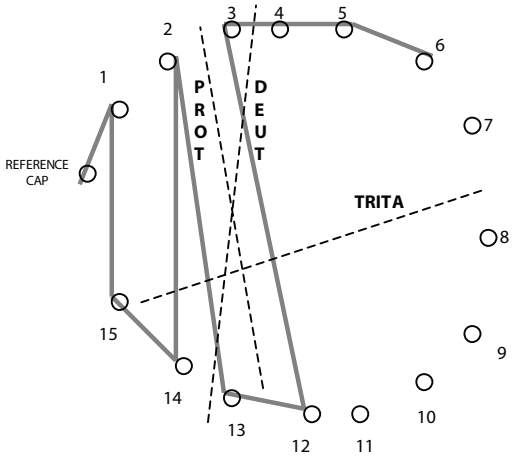
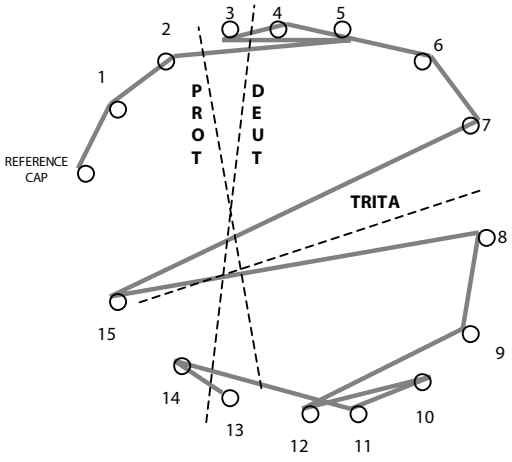


Figure 6 Tritan



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Re-testing

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

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.

Deuteranomaly 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 Lanthony 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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