Dyop® Test Basics

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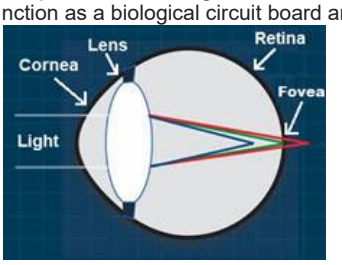
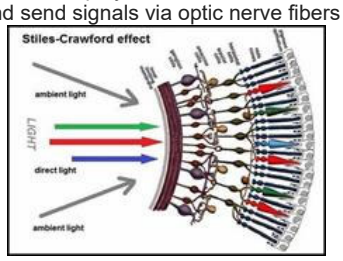
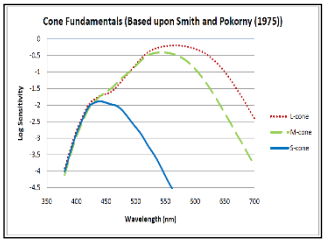
The eye is a biological machine, and visual acuity as the measure of how clearly we see. Traditional acuity is measured by the ability to detect the gap between two static points or lines. **However, vision is dynamic and autonomic, rather than static**. That dynamic process enables us to eat rather than be eaten and is provided by the refresh rate of the cone photoreceptors in the back of the retina. Those photoreceptors function much like a pixelized scanning line of an electronic display. The stimulus from clusters of photoreceptors allows the neurons on the inner surface of the retina to function as a biological circuit board and send signals via optic nerve fibers to both the brain and to the muscles regulating the shape of the lens.



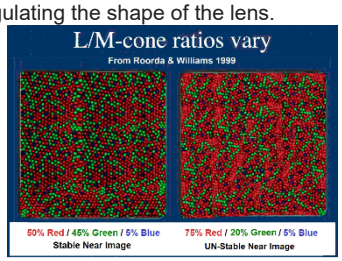
Structure of the Eye



Structure of the Retina



Color Perception

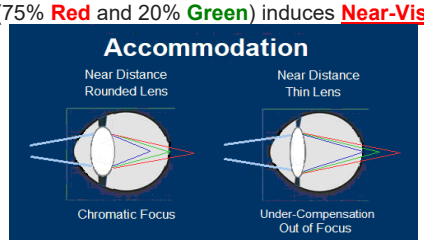


Stable Near Image vs. Near-Vision Stress

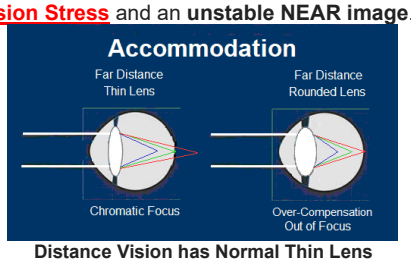
That adjustment of the lens by the cone photoreceptors uses the focal depths of the **Blue**, **Green**, and **Red** colors, and the process of **Chromatic Triangulation** to regulate acuity. That process is much like the concept of triangulation on a map which lets you determine your location by knowing the distance and direction to three points. The **Chromatic Triangulation** and focal adjustment of the biological lens adjusts has the lens change its shape so that the spectrum of **Blue**, **Green**, and **Red** has **Green** focused **ON** the retina, **Blue** in **FRONT**, and **Red** **BEHIND** the retina.

Chromatic Triangulation has Blue in FRONT of the Retina, Green Focused ON the Retina, and Red BEHIND the Retina

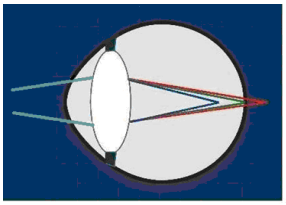
A **Stable Near Image** has a ratio of 50% **Red**, 45% **Green** and 5% **Blue** photoreceptors. However, a higher percentage of **Red** photoreceptors (75% **Red** and 20% **Green**) induces **Near-Vision Stress** and an **unstable NEAR image**.

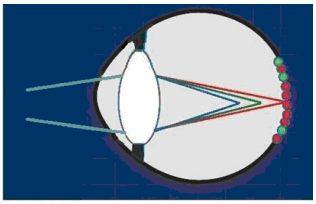


Near Vision has Normal Rounded Len with Green focused ON the Retina

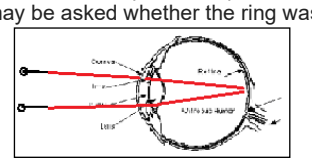


Distance Vision has Normal Thin Lens with Green focused ON the Retina

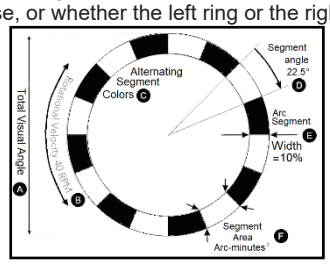

50% Red and 45% Green photoreceptors
Stable Near Vision


75% Red and 20% Green photoreceptors
Near Vision Stress

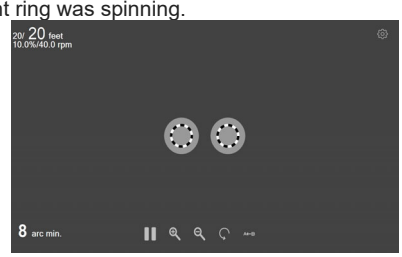
A **Dyop®** (pronounced "di-op"- and short for **dy**namic **op**totype) is a segmented ring with contrasting spinning gaps and segments (typically **Black/White**) which provide a strobic stimulus to the photoreceptors. The **Dyop diameter** (angular arc width) is used as an indicator for measuring acuity and refractions. The strobic perception of **Dyop** gap/segment motion resonates with the refresh rate of the photoreceptors and functions as the visual equivalent of an audio tuning fork with an optimal 40 rpm rotation rate. With a Dyop duo display (only one spinning Dyop), the **angular diameter** of the smallest Dyop ring, where the spin direction can be detected, is the **acuity and refraction endpoint.** The smallest Dyop stimulus gap area detectable is about 20 fovea photoreceptors. With smaller (**sub-acuity**) Dyop diameters the **spin direction cannot** be detected. To detect false positives, the subject may be asked whether the ring was spinning clockwise or counter-clockwise, or whether the left ring or the right ring was spinning.


1000 years ago, acuity was measured by the ability to see the separation between two points or lines.

1862 - Snellen Acuity



Dyop 20/20 Adult Acuity

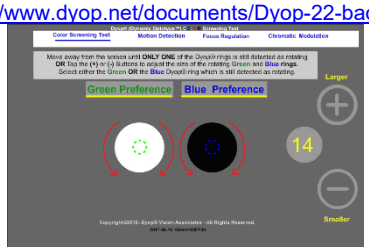


Dyop 20/20 Adult Acuity

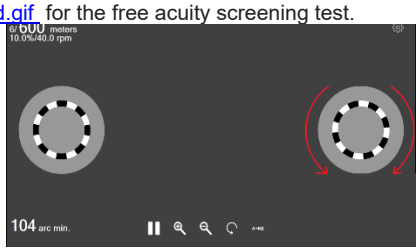
Static visual targets, such as Snellen letters, deplete the refresh of the photoreceptors and do NOT measure visual acuity as accurately or consistently as a Dyop. **Equal sizes of different letters and designs do not imply equal recognizability or accurate acuity measurement.**

Dyop acuity is up to **six times** as precise, up to **eight times** as consistent, and up to **twice** as efficient of Snellen testing. A Dyop can be used to measure acuity regardless of patient age (such as infants), culture, or relative literacy of the patient. The **Child Dyop Test** (with two peripheral Dyops) and the **Infant Dyop Test** (with one alternating peripheral spinning Dyop), both use preferential looking. Tracking the **ONE** peripheral spinning Dyop **as the Dyop diameter gets smaller** allows detecting the peripheral motion of the subjects head and/or eyes until sub-acuity spinning cannot be detected.

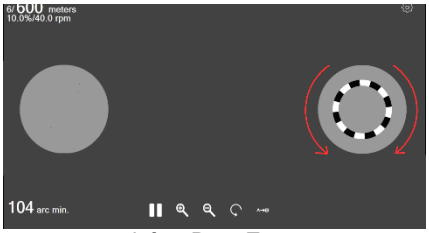
The **Color Screening Test** for either a **Stable Near-Vision or Near-Vision Stress** has two spinning Dyops, one **Green**/White and the other **Blue**/Black. Preferential detection of the **Blue**/**Black** Dyop is an indicator of **Near-Vision Stress** and potential symptoms of dyslexia, migraines, and epilepsy. See **https://www.dyop.net/documents/BlueGreenScreening.gif** **or** **bluegreenscreening.com** for the free color screening test. See https://www.dyop.net/documents/Dyop-22-background.gif for the free acuity screening test.



Screening for Near-Vision Stress



Children's Dyop Test



Infant Dyop Test