Dyop® Infant Acuity Testing

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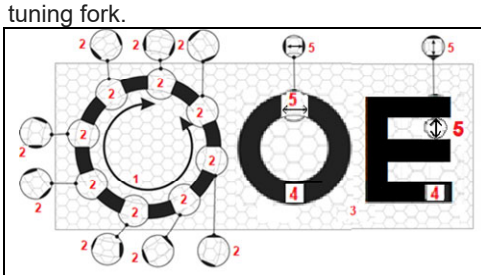
Vision is a dynamic process which enables us to eat rather than be eaten. The vibratory motion of the visual saccades **inherent in all animals** refreshes the response of the photoreceptors in the back of the retina. That refresh allows the neurons on the retina inner surface to act as the equivalent of a biological circuit board. The constant motion of the saccades allows the blue, green, and red photoreceptors to use the chromatic triangulation of their focal depths to regulate acuity.

A **Dyop®** (short for dynamic optotype) is a spinning segmented ring with contrasting (typically Black/White) segments and gaps which provide a strobic stimulus to the photoreceptors for use as a visual acuity target and for refractions. The smallest arc width diameter of a Dyop ring, where the direction of spin can be detected, is the visual acuity and refraction endpoint. At a Dyop sub-acuity angular width, the direction of spin cannot be detected. The motion of the saccades results in the strobic Dyop segment/gap motion **Resonating** with the refresh rate of the saccades and functioning much as a visual equivalent of an audio tuning fork.

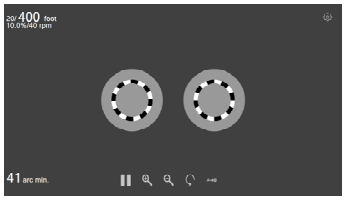
	**Item 1** – the visual angular movement/velocity for the strobic contrast response (40 RPM) and dynamic stimulus rate of 0.33 arc minutes squared per second. **Item 2** – the moving segmented **0.54 arc minute squared** minimum visual **area (MAR)** for **Resonance Acuity** dynamically stimulating a **cluster of 20 retina photoreceptors** **Item 3** – retinal cell clusters **Item 4** – examples of static historic optotypes **Item 5** – the static 1.0 arc minute squared minimum **area (MAR)** of **Resolution/Recognition Acuity** of a cluster of **40 retina photoreceptors** for a historic optotype
Types of Optotypes	**Dyop Components**

Historic acuity measurement was based on the concept of **Resolution Acuity** (the ability to detect the separation of two points such as stars) or **Recognition Acuity** (the ability to identify an array of European letters as devised in 1862 by Dr. Herman Snellen). However, static optotypes counter the effectiveness of the saccades and deplete the refresh of the photoreceptors. Because a Dyop resonates with the vibrations of the saccades, it creates a much more precise and consistent concept of **Resonance Acuity**

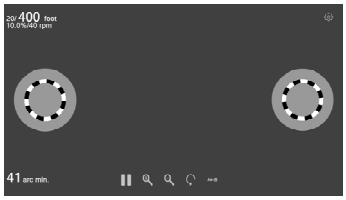
The **Adult Dyop Test** has two identical diameter Dyop rings near the center of the display with only one ring as spinning. The **Children's Dyop Test** has two peripheral Dyops with only one ring as spinning. The ring diameters are identical and the visual acuity endpoint is the diameter of the smallest Dyop ring which was detected as spinning. To detect false positives the subject is asked whether the spinning ring was the left ring or the right ring, or whether that ring was spinning clockwise or counter-clockwise.

The **Infant Dyop Test** has only **ONE** peripheral Black segmented Dyop on a White background which alternates its peripheral location as the Dyop diameter, or spin direction, changes. Because of the preferential tendency for motion detection, the **Infant Test** and the **Children's Test** can both use the motion of the subjects head and/or eyes to track the far right side or the far left side of the monitor as the peripheral location of the spinning Dyop.

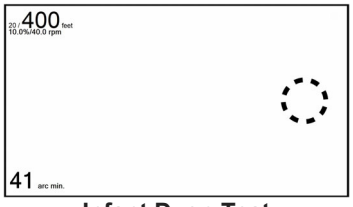
Using remote access software such as AnyDesk also allows acuity testing to be done successfully regardless of the differences in the computer operating system or distance between the subject and the examiner. Color acuity testing may also be done to detect the potential for symptoms of dyslexia, migraines, or epilepsy.



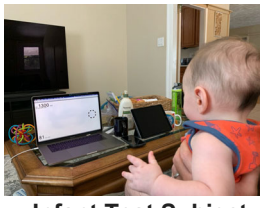
Adult Dyop Test



Children's Dyop Test



Infant Dyop Test



Infant Test Subject

Using AnyDesk, a 14 week-old test subject, whose parents only had access to a MacBook computer, had his acuity tested using the Infant Dyop Test originating on a PC. With AnyDesk, the proper test calibration could be determined on the MacBook even though it was 2000 miles from the PC host. The camera on the MacBook also allowed the test provider to monitor the eye and head movements of the 14 week-old test subject using Facetime on the test provider's iPhone.

The results were conclusive that the 14 week old test subject had 20/440 (or 6/135) acuity. Using colored Dyops, it was determined that the 14 week-old test subject also had 20/950 acuity for perceiving Green/White and 20/2000 acuity for Blue/Black. That indicated that the subject likely did NOT have dyslexia since the Green/White acuity was better than the Blue/Black acuity.

The net advantage of Dyop acuity is that it is more precise than Snellen testing, with one-sixth the variance, and with three to four times the efficiency of Snellen testing as to acuity and refraction measurement. A Dyop retains those advantages regardless of the age, culture, or relative lack of literacy of the subject being evaluated. A Dyop can be used to measure acuity in color, and a Dyop can be used for measurement of impaired or less developed acuity systems such as that of an infant.