

## Cone-Isolation & Achromatic Contrast Sensitivity

# ColorDx<sup>®</sup> CCT<sup>HD</sup>

ColorDx CCT-HD is the state-of-the-art device for assessing color vision deficiencies in high-definition.

Contemporary eye care includes qualitative and quantitative assessment of this important measure of visual pathway function.

# New Gold Standard Color Vision Assessment

ColorDx CCT-HD is designed to detect abnormalities and characterize the contrast sensitivity of the color mechanisms of the human visual system using a highly granular, cone-isolation contrast sensitivity technique.



**U.S. AIR FORCE**

*Developed by Konan Medical in collaboration with the United States Air Force School of Aerospace Medicine OBVA (Operational Based Vision Assessment) laboratory) under CRADA, CCT-HD represents the new gold standard for color vision diagnostics.*

## Clinical Benefits of Diagnostic Color Vision Testing

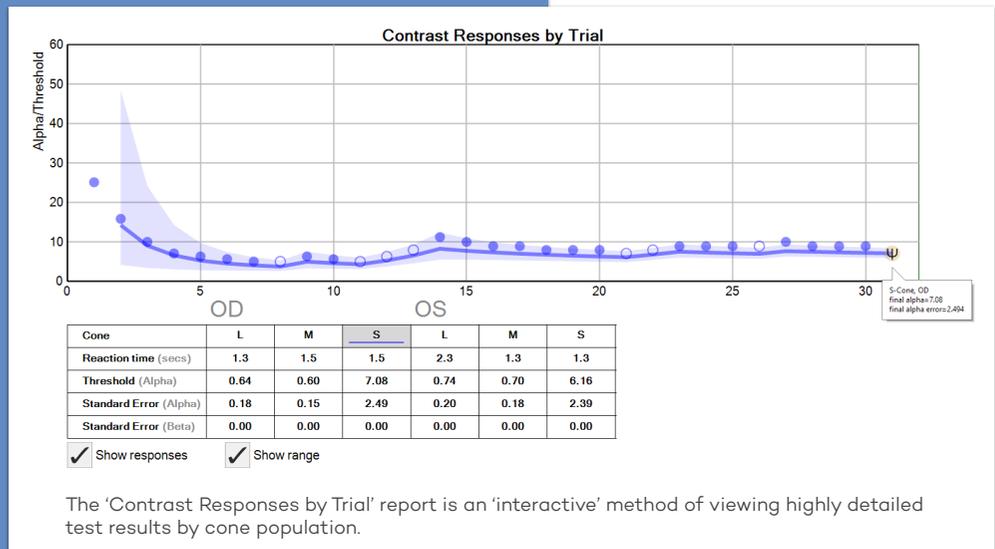
Blue (S-scone) defects may be the most common acquired loss of chromatic discrimination.

“Acquired CV defects, however, are estimated to be present in 15% of the general population regardless of sex. Over 300 medications and disease processes are associated with inducing CV disturbances”<sup>1</sup>.

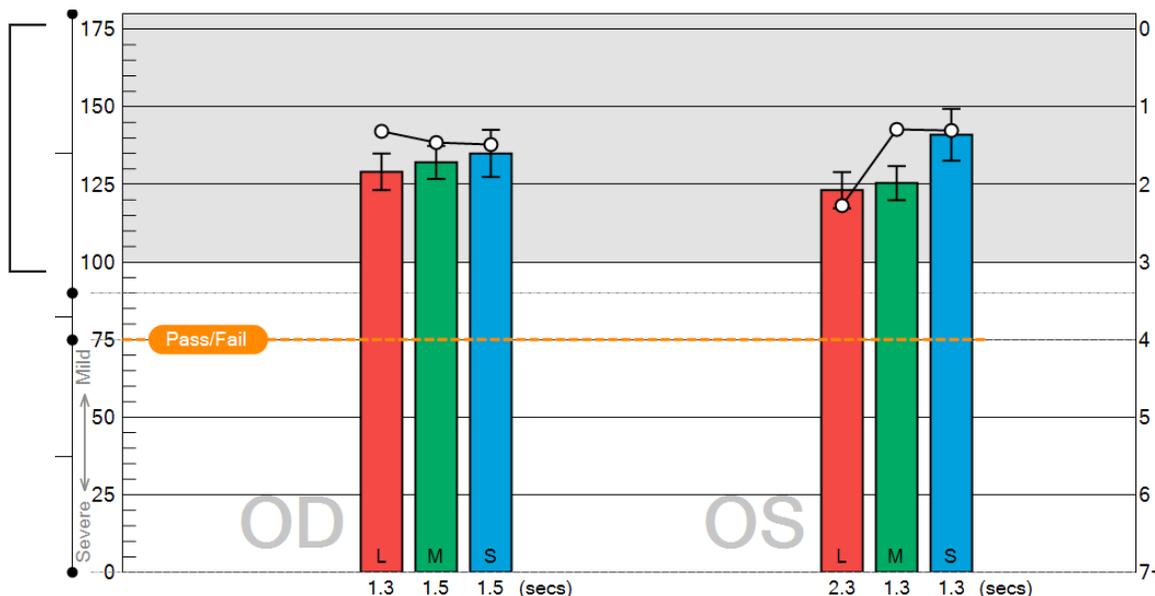
This important but often overlooked clinical sign may be caused by retinal, optic nerve, or neurological disorders, in addition to cataracts and high-risk meds, as well as hundreds of common drugs and substances<sup>2</sup>.

### Key Features:

- Cone-Isolation methodology
- “Landolt C” based test strategies
- Simple to use 4-button response pad
- Robust thresholding and standard error
- Konan custom-calibrated IPS display technology
- Rapid, intuitive, staged calibration
- Expanded low-contrast range testing
- High fidelity cone-contrast granularity
- Expansive illustrated reporting
- Auto trends analysis
- Contrast Sensitivity (achromatic) with auto AUC calculation
- Landolt C high contrast acuity
- CPT Code 92283



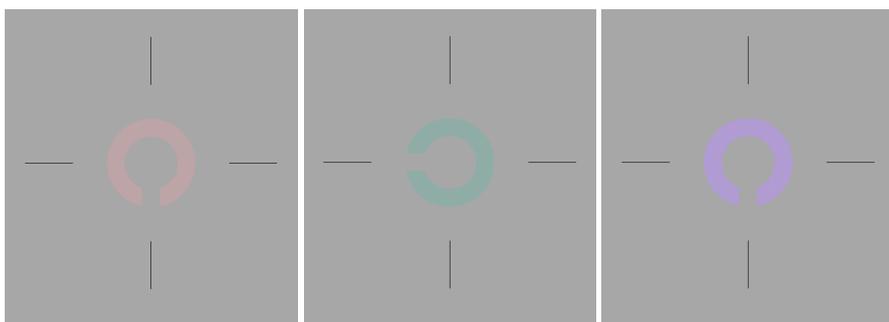
The expanded ceiling shows new information that was not available in the original CCT. Clinically, it may be useful to measure changes in color vision earlier.



An example of a report showing a high-normal range of color vision in all three cone cell populations OD and OS. The 'Pass/Fail' line (Score =75) is the USAF criteria for pilots.



Konan's 4-button USB response pad makes test administration easy.



A rotated Landolt C is used to assess L (Red), M (Green) and S (Blue) cone cell function. The 4 response options are simply UP, DOWN, LEFT OR RIGHT.

“As expected, most DR eyes showed some degree of relative blue-yellow dyschromatopsia (89%) with few showing a greater weighting towards red-green dyschromatopsia (11%)<sup>3</sup>.”

# CCT-HD Highlights

**CCT**  
original USAF

low granularity

contrast ceiling

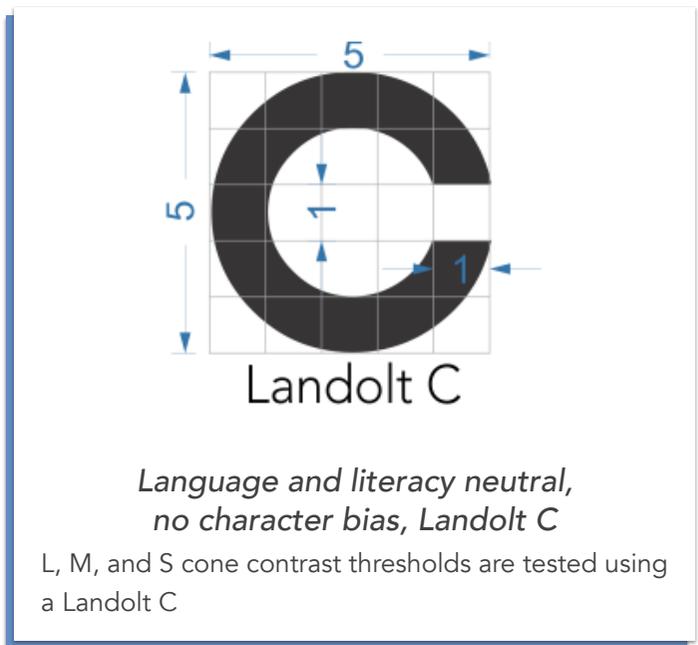
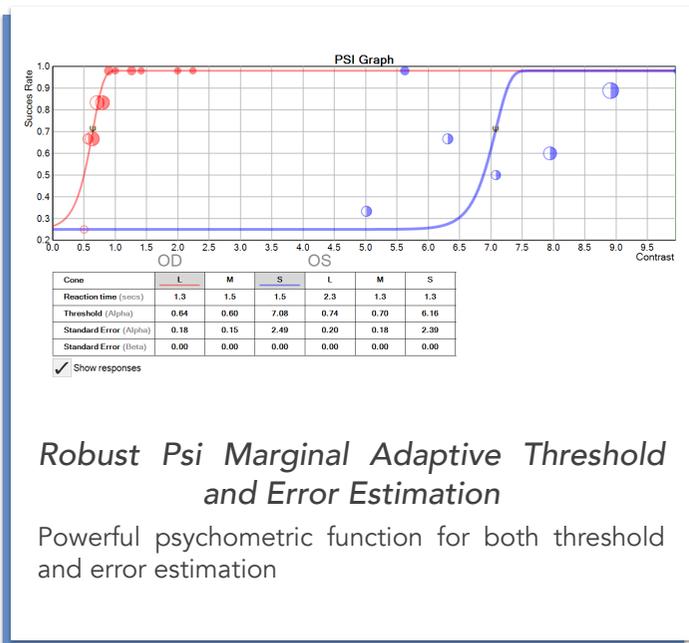
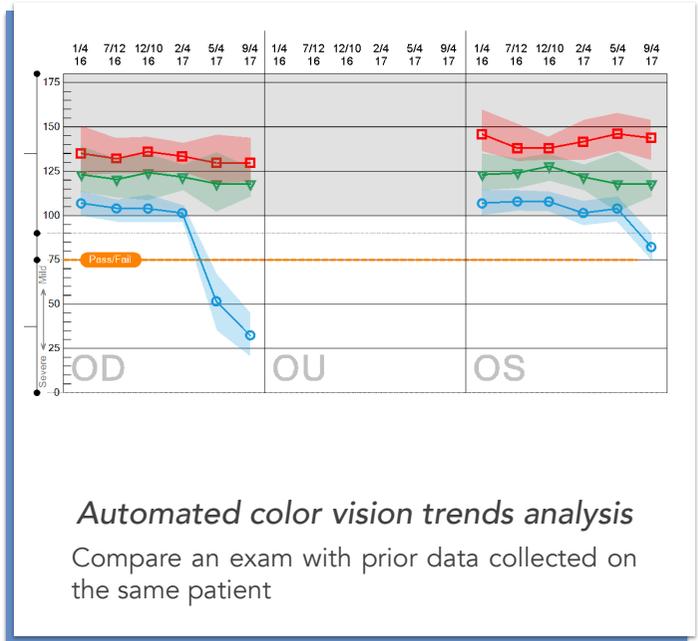
low-contrast

expanded range

**CCT<sub>HD</sub>** high granularity

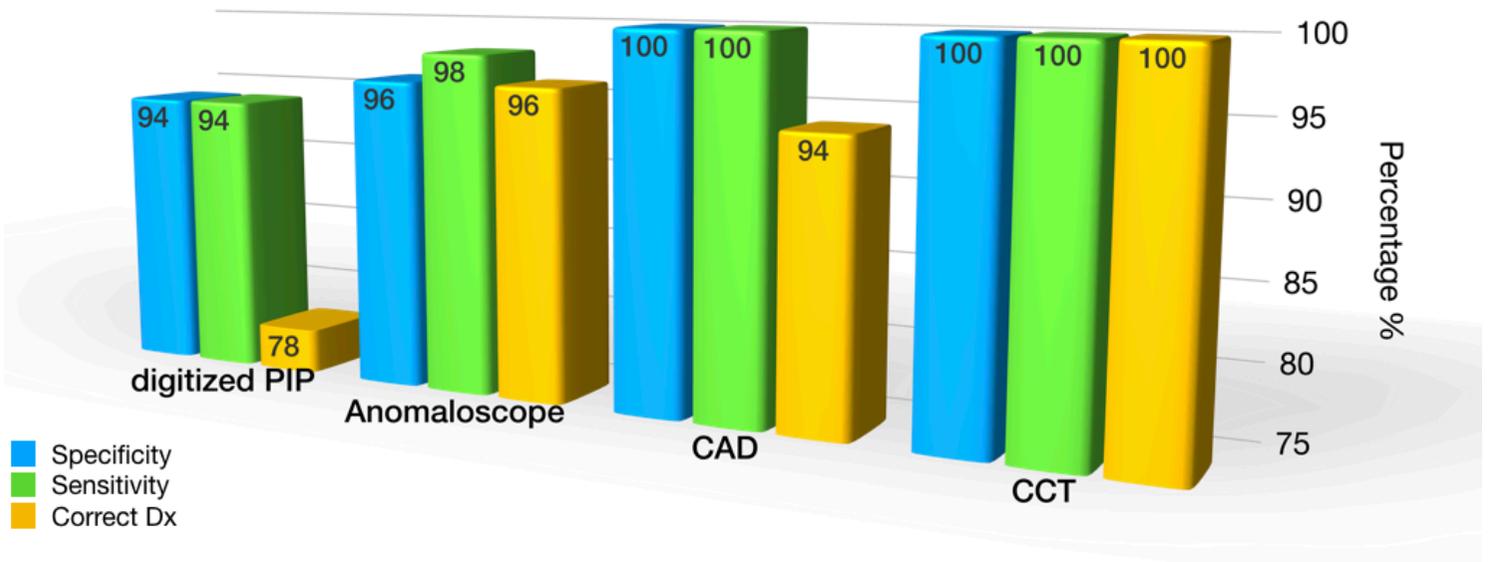
*High Granularity*

CCT-HD provides highly granular cone-isolation contrast steps for discrete, scalar scoring



# Color Vision Diagnostic Precision

*The foundations for a new gold standard:  
CCT cone-isolation contrast sensitivity*



**USAF clinical comparison of four color vision diagnostic devices from 50 color normal and 50 color abnormal subjects: digitized PIP (pseudo-isochromatic), Anomaloscope (Rayleigh color-mixing), CAD (color-camouflage), and CCT (cone-isolation contrast sensitivity).**

Illustration adapted from: Gaska, J, Winterbottom M, van Atta A. Operational Based Vision Assessment Cone Contrast Test: Description and Operation. USAF School of Aerospace Medicine, Aeromedical Research Dept. Wright-Patterson AFB; 2016 1.

“ Acquired CV defects, however, are estimated to be present in 15% of the general population...” ”

<sup>1</sup>Rayman RB, Hastings JD, Kruyer WB. Clinical Aviation Medicine. New York: Castle Connolly Graduate Medical Publishing. 2006;200(2000):251-252.2013.

<sup>2</sup>Fraunfelder FT, Fraunfelder FW, Chambers WA. Drug-Induced Ocular Side Effects: Clinical Ocular Toxicology E-Book. Elsevier Health Sciences; Sep 19, 2014.

<sup>3</sup>The dyschromatopsia of optic neuritis is determined in part by the foveal/perifoveal distribution of visual field damage.

Silverman SE, Hart WH, Gordon MO, Kilo C. The Dyschromatopsia of Optic Neuritis Is Determined in Part by the Foveal/Perifoveal Distribution of Visual Field Damage. Invest Ophthalmol Vis Sci 31:1895-1902, 1990.

# Specifications

|  |   |
|--|---|
| Fundamental Method                                   | Cone-Isolation and Achromatic Contrast Sensitivity  |
| Co-development with US Air Force                     | Under CRADA (Creative Research and Development Agreement) with USAF School of Aerospace Medicine OBVA Team  |
| Testing Options                                      | All cones, individual L, M, S cones or any combination; Monocular or binocular; Adaptive or Full Threshold; user selected test distances with dynamic optotype sizing; Tone feedback options  |
| Trends Analysis                                      | Detailed trending over time by eye, by isolated cone  |
| Psi Threshold  | Robust, academic-based Bayesian threshold method with on-screen visibility of Standard Error estimations by response  |
| Adaptive Testing                                     | User-selected adaptive test seamlessly reduces test time for subjects with low standard error score   |
| Achromatic Contrast Sensitivity                      | Contrast sensitivity reported at 4 contrast levels, and AUC indicative of overall functional vision   |
| Monocular and binocular                              | User selected administration of tests OD and OS or OU   |
| On-screen help                                       | Beautifully illustrated on-screen help  |
| Reporting  | On-screen with xpressly with clear, language-independent response feedback, PDF to network printer, and PDF to network EMR location   |
| <b>Accessories</b>                                   |   |
| Computer   | Dell AIO PC with custom, high-precision color profiled 22" anti-glare monitor, Windows 10 Pro, keyboard and mouse   |
| 4-button response pad                                | Konan exclusive USB answer interface eliminates hunt and peck on a keyboard or mouse  |
| USB Colorimeter                                      | OEM i1Pro with built-in fast system color verification and automated calibration  |
| Onscreen help  | Illustrated on-screen help for reporting features   |
| Patient Instructions and interactive practice widget | Available in multiple languages, illustrated patient instruction page includes an interactive demo to assure instructions are understood and demonstrated proficiency prior to testing including auditory feedback as "correct" tone or "miss" tone |
| Regulatory   | FDA Listed   CE   TGA   |

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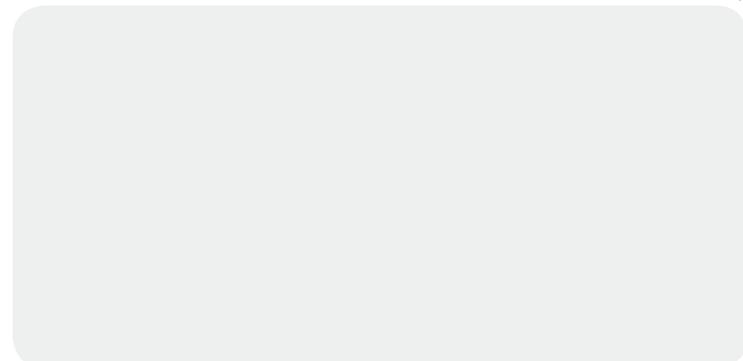
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