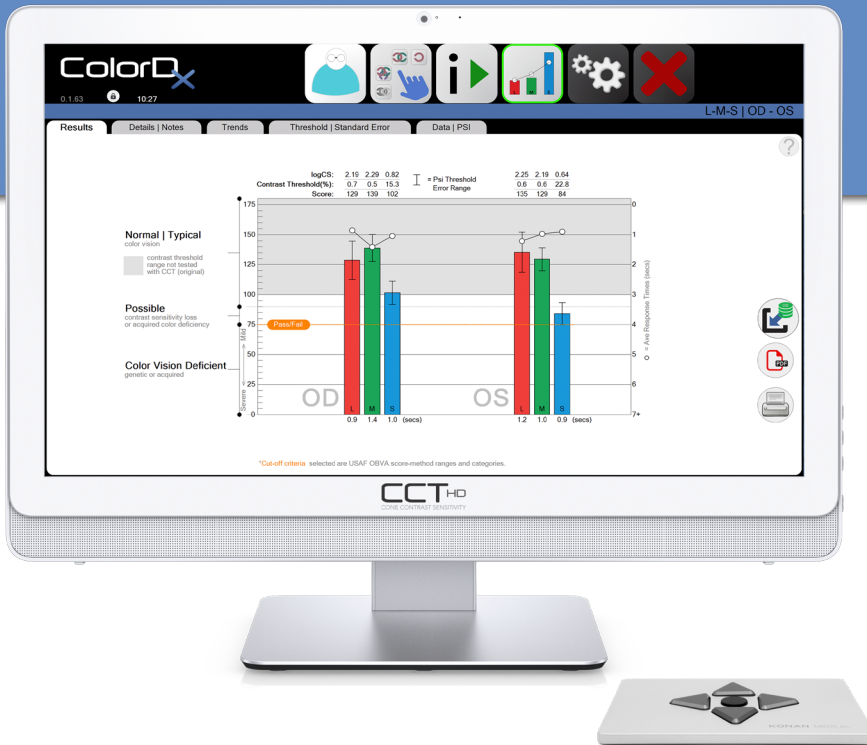


Cone-Isolation Contrast Sensitivity



ColorDx[®] CCT[®] HD

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

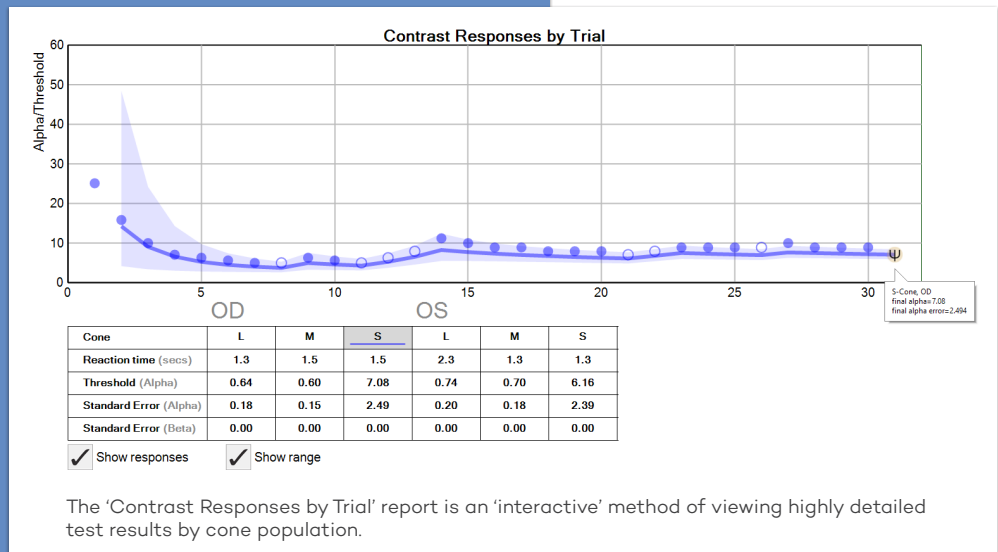
Blue (S-scone) defects may be the most common acquired loss of chromatic discrimination.

“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”¹.

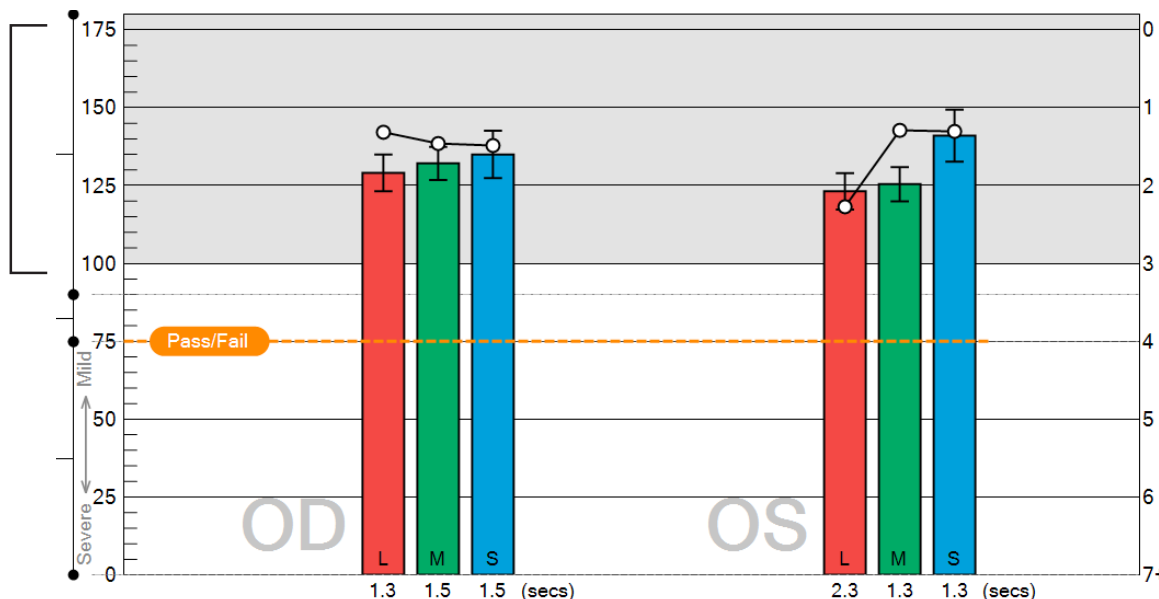
This important but often overlooked clinical sign may be caused by retinal, optic nerve, or neurological disorders, in addition to cataracts and high-risk meds, as well as hundreds of common drugs and substances².

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



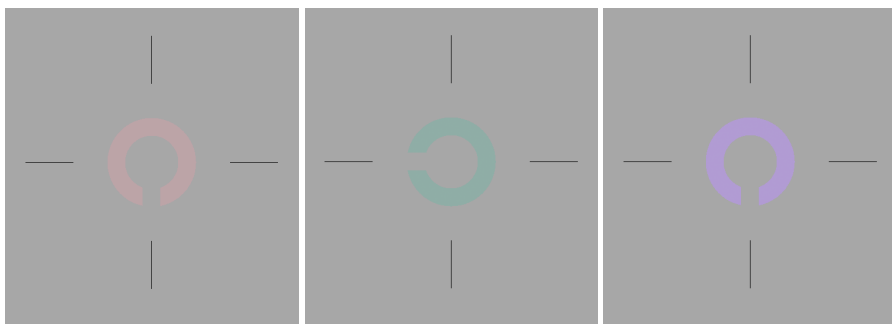
The expanded ceiling shows new information that was not available in the original CCT. Clinically, it may be useful to measure changes in color vision earlier.



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%)³.”

CCT-HD Highlights

CCT
original USAF

low granularity

contrast ceiling

low-contrast

← expanded range

CCT_{HD} high granularity

High Granularity

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

Automated color vision trends analysis

Compare an exam with prior data collected on the same patient

PSI Graph

Cone	OD			OS		
	L	M	S	L	M	S
Reaction time (secs)	1.3	1.5	1.5	2.3	1.3	1.3
Threshold (Alpha)	0.64	0.60	7.06	0.74	0.70	6.16
Standard Error (Alpha)	0.18	0.15	2.49	0.20	0.18	2.39
Standard Error (Beta)	0.00	0.00	0.00	0.00	0.00	0.00

Show responses

Robust Psi Marginal Adaptive Threshold and Error Estimation

Powerful psychometric function for both threshold and error estimation

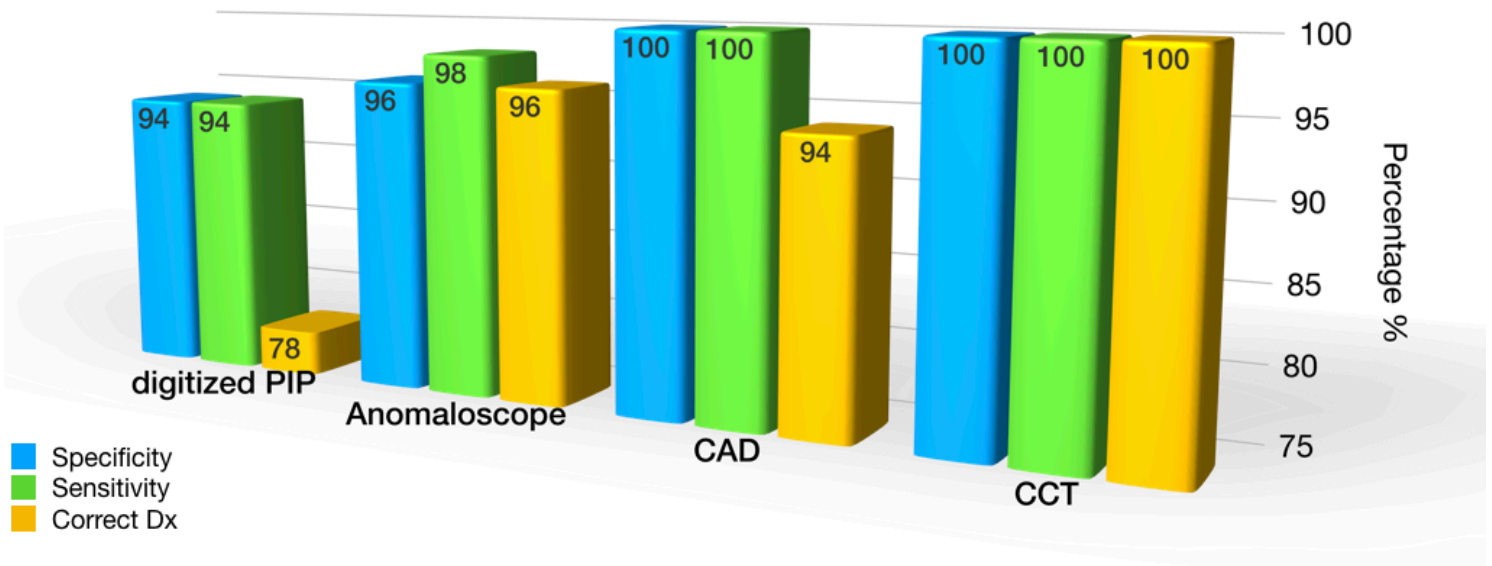
Landolt C

Language and literacy neutral, no character bias, Landolt C

L, M, and S cone contrast thresholds are tested using a Landolt C

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...” ”

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

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

³The 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 expressly clear, language-independent response feedback, PDF to network printer, and PDF to network EMR location
Accessories	
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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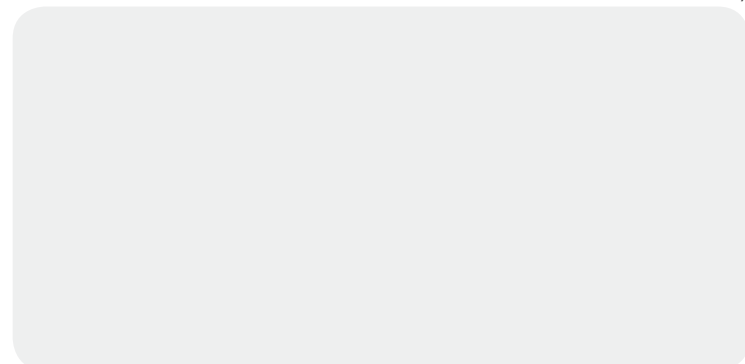


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