EyeSuite Visual Field Analysis Software: a Clinician's Experience

BY JONATHAN MYERS, MD

A year ago, my practice installed EyeSuite software (Haag-Streit USA Inc., Mason, OH) on all of our computers in our electronic medical records office. The EyeSuite software is a visual field management and analysis system. Before, we had either viewed visual fields as PDF images on the screen or as traditional paper printouts with printed series analysis.

EyeSuite has been a great step forward for me in the daily care of patients. It allows me to access any patient's visual fields from any computer on my office network. Additionally, the software has analysis algorithms that simplify and expedite my interpretation of a single field or a series of fields. For the first time, I actually prefer viewing fields on the computer than on paper. I use the software to view patients' recent Octopus field tests (Haag-Streit USA Inc.) and also prior Humphrey visual field tests (Carl Zeiss Meditec, Inc., Dublin, CA).

HOW IT WORKS

The EyeSuite software interface starts with a simple screen where the user selects a patient. Once a patient has been selected, all of his or her visual fields are shown as grayscale "thumbnail" pictures across the bottom of the screen, each with a caption showing the date of the field and its reliability indices. With a single click, the most recent field is displayed in a customizable view that shows a user's preferred four-item view. For example, a doctor might choose to show the raw numbers (sensitivities), the grayscale, total deviation plot, and corrected box plot of probabilities (Figure 1).

A second click shifts the analysis from a single field to a series of fields. The software defaults to analyze the last six fields, but with a click, additional past fields can be added. The graphical analysis will then show the trends for the mean deviation, diffuse defect, and local defect for each eye, along with icons to flag statistically significant trends for progression in any of these areas (Figure 2). This setup is similar to that of the Humphrey system's Visual Field Index, which shows the global trend for change of entire fields and extends that trend into a predicted future. EyeSuite's analysis does not make any predictions for the future, but it does show the diffuse versus local defect trends by linear regression analysis and makes it easy to choose which fields to include in the analysis.

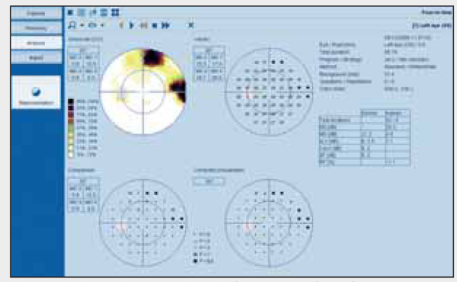

Figure 1. Four-in-one view. Color grayscale, values, comparison, and corrected probabilities are shown. Other options can be chosen as the default view according to the physician's preference.

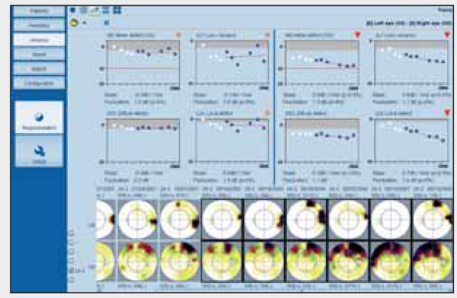

Figure 2. EyeSuite shows thumbnails of each field in a series at the bottom of the screen. The shaded box outlines are the fields included in the trend analysis (red lines) above. At top right are the last six fields analyzed for the right eye. The red downward triangles signify statistically significant worsening by linear regression analysis for the mean defect, local defect, and square root of loss variance.

EyeSuite allows further analysis of progression in two additional views that may be novel to many clinicians. The first is a Cluster Trend Analysis. It breaks the field into several "clusters"—groups of points covering areas with a shared distribution of

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nerve fiber layer bundles. Examples include the nasal step area and the arcuate region. The values at these points are grouped together, and the software analyzes the average values for each region over time by linear regression. Grouping these points reduces variation from small shifts in fixation. Linear regression allows the identification of significant trends for change, while controlling for the patient's own variability over time in that region. The result is the average change for each region, in decibels per year, with the displayed icons indicating a high statistical probability of progression in a given area (Figure 3). This approach differs from STATPAK (Carl Zeiss Meditec, Inc.), which shows a change from average baseline data at every point in the field and alerts the user (with shaded triangles) to possible change from baseline values at any given point.

An additional view in EyeSuite is the Polar Trend Analysis, which traces each point in the field back to its likely origin at the disc. A radial line represents each field-testing point's initial and final defect values for a series of fields. For example, a point within a superior nasal step that progressed from -5 dB to -15 dB would be shown as an inferotemporal radial line extending from a circle representing 5 dB of loss out to a larger circle representing a 15-dB loss.

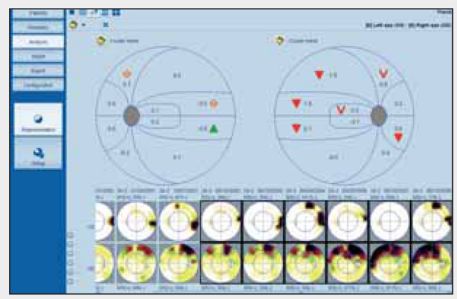

Figure 3. EyeSuite Cluster Trend analysis shows groups of points sharing similar nerve fiber layer bundles such as a nasal step. In this example, the right eye (on the right side of the figure) shows progression in the superior and inferior nasal steps, the superior arcuate, and the inferior temporal wedge regions, as highlighted by red downward triangles indicating significant change by linear regression in each of these areas. The numbers in the areas are the average loss per year in decibels for each point in that area.

CONCLUSION

It is exciting to see innovation in visual field analysis aimed at helping clinicians to "separate the wheat from the chaff." These tools allow physicians to quickly identify areas of concern and then to drill down as deeply into the details as they desire. After a couple of weeks, this approach made my interpretation of fields more efficient and less cumbersome than a traditional review of printouts of individual fields and series of fields.

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