Interpreting the TCA Overview Report

HEIDELBERG ENGINEERING ACADEMY

Patient Information: Displays examination period from baseline to last follow-up, calculating elapsed time.

Baseline Exam: Reflectance image of initial exam.

Follow-Up Exams: All exams eligible for TCA appear in order from left to right, top to bottom.

In follow-up images, signficantly changed superpixels are marked with color.

For TCA (Topographic Change Analysis), images of at least three examinations (baseline and two or three follow-up exams) are compared. Before the analysis, these images are automatically aligned.

Changes are only displayed, if in an area of at least one superpixel the change is:

- statistically significant compared to the variability of single images of a series (F-Test)
- reproducible in at least two follow-up exams.

Areas with statistically significant changes are overlayed with red and green, whereby red areas indicate areas of significantly lower height measurement, green areas indicate higher height measurements. The colour intensity reflects the extent change measured.

Trend Analyis: The graph summarizes the development of the entity of all red marked clusters over time.

Changes in volume and area are displayed separately as two independent lines.

The values for changes in area are represented as blue squares (left ordinate, y-axis), the values for voluem change are displayed as red triangles (right ordinate).

The left ordinate (area change) is set to a range of 0–2mm^2 by default, the right ordinate (volume change) to 0–0.1mm^3. When one of the parameters is exeeded , the respective axis is rescaled, whereby the factor is displayed in a red circle next to the axis (in this example „2x" for the right ordinate „volume change"). The other axis remains unchanged.

The x-axis shows examination dates over 12 years.

Heidelberg Retina Tomograph
TCA Overview

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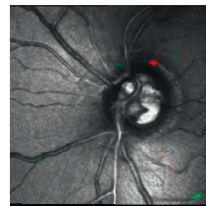
Patient:

Sex: DOB: Pat-ID: Ethnicity:

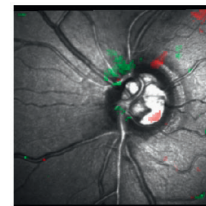**OS**

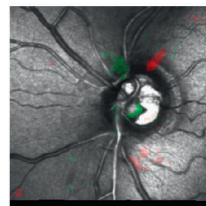**Examination:**   Baseline: Last Follow-Up: Elapsed: 55 months
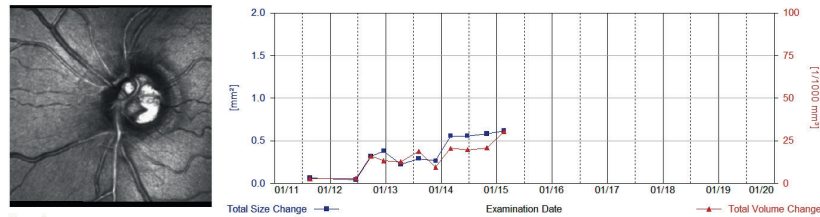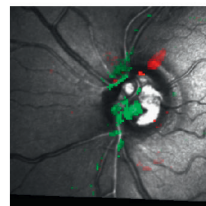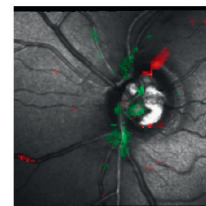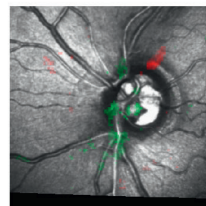

Baseline:
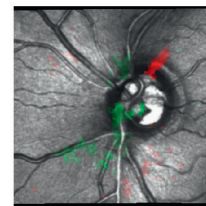
Follow-Up: #2   Follow-Up: #3   Follow-Up: #4

Follow-Up: #5   Follow-Up: #6   Follow-Up: #7

Follow-Up: #8   Follow-Up: #9   Follow-Up: #10

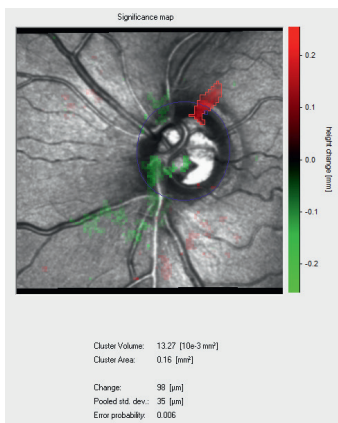## Reliable Statistical Progression Analysis

- **Optimized image alignment:** New algorithms for image alignment result in an enhanced precision of progression analysis.

- **Broad area coverage:** The entire image area is analysed for change, indepentently of the contour line.

- **Compatibility with all HRT devices:** Because of the stability of the HRT image acquisition technology, years of previously collected patient data can still be used and analized with the new software.

- The HRT analyses differences in measurement values over time on their statistical significance. As each image comprises data from three images series, the variability between these image series can be determined and compared to the measured change over time. Only changes which are considerably higher than the measurement variability are statistically relevant and are displayed in the significance map.

Powerful Tools

Significance map

| Cluster Volume: | 13.27 [10e-3 mm²] |
Cluster Area:	0.16 [mm²]
Change:	98 [µm]
Pooled std. dev.:	35 [µm]
Error probability:	0.006

Topographic Changes

- Areas of statistically significant changes are displayed in red and green. The magnitude f change is indicated by a colour gradient.

- Contiguous areas of change (clusters) as well as individual superpixels are mapped and tracked for both area and volume changes.

  The contour line marking the optic disc margin is indicated by a blue circle (optional). Note: Progression Analysis is completely independent of the contour line.

Cluster Analysis
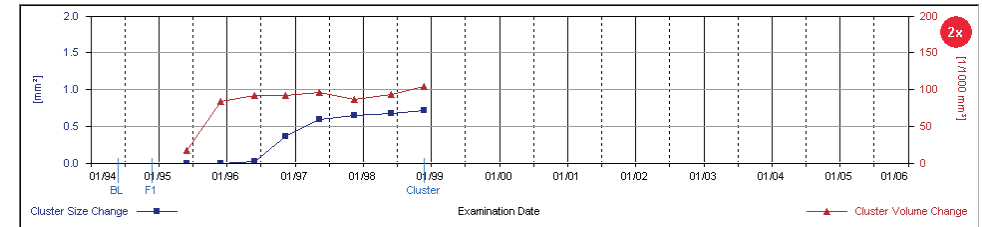
- Area and volume of changes in the sum of all clusters are plotted over time for independent analysis.

The Established Trend Analysis of Parameters
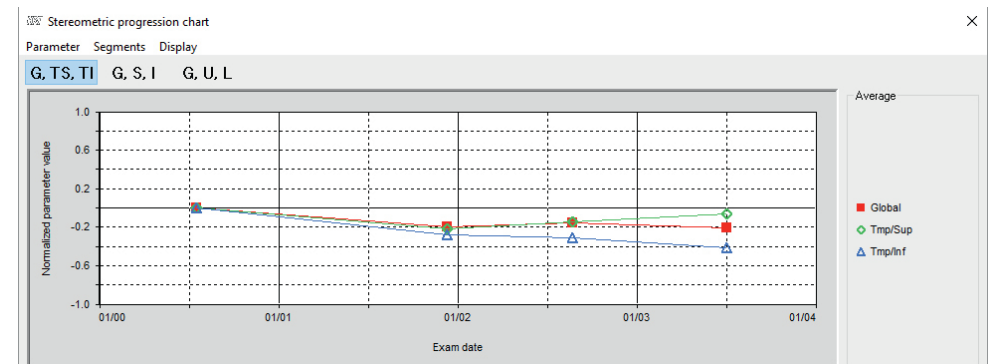
- Parameters are normalized and plotted over time to show common direction.
- Users can select specific parameters and sectors of the optic nerve head to be assessed.

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