RTA 5

Fundus | Macula | RNFL | ONH | Disc

Moving forward with a different perspective

MARCO

THE LEADER IN VISION DIAGNOSTICS®

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Fundus | Macula | RNFL | ONH | Disc

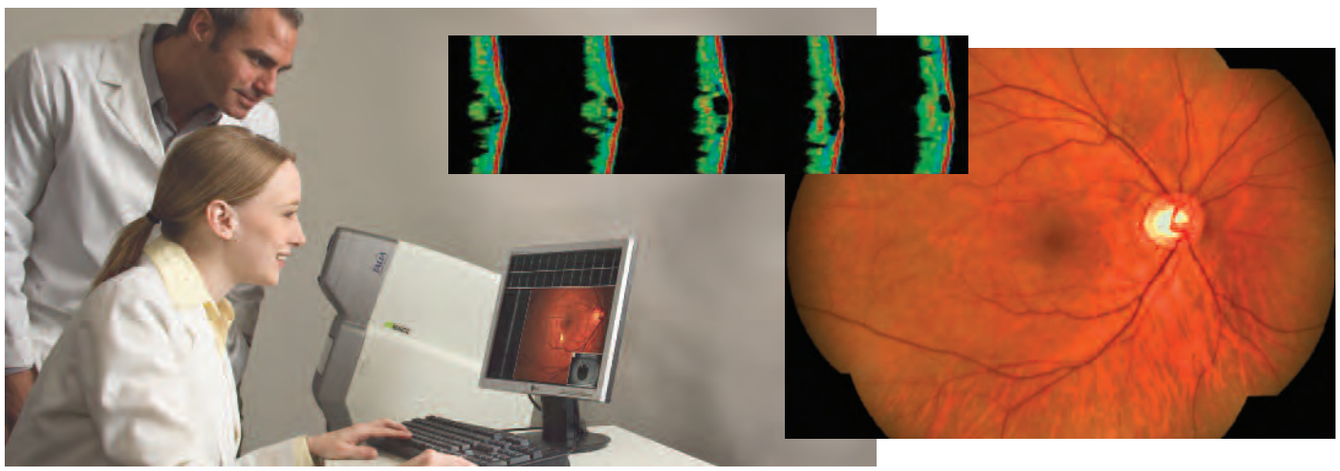
The Leader In Vision Diagnostics™ Offers A New Perspective

Marco has served the eyecare community by offering exceptional lane products and automated high tech diagnostic devices with unsurpassed customer service, training, and trusted Partners for Life™ support. This tradition of excellence has resulted in proven patient and practice benefits including increased efficiency, greater patient throughput, and a higher standard of diagnostic care.

The Marco commitment to provide differentiated product and partnership solutions is underscored with the introduction of the RTA 5 – an essential, practice building diagnostic instrument of unparalleled value.

The Difference is Marco.

RTA 5 Technology The RTA 5 represents a new perspective in diagnostic imaging. It is the first system which integrates high speed scanning laser ophthalmoscopy (SLO) with high resolution digital fundus imaging for early detection, diagnosis, and progression analysis of pathology involving the macula, perimacular regions, optic nerve head, and peripapillary regions of the retina.

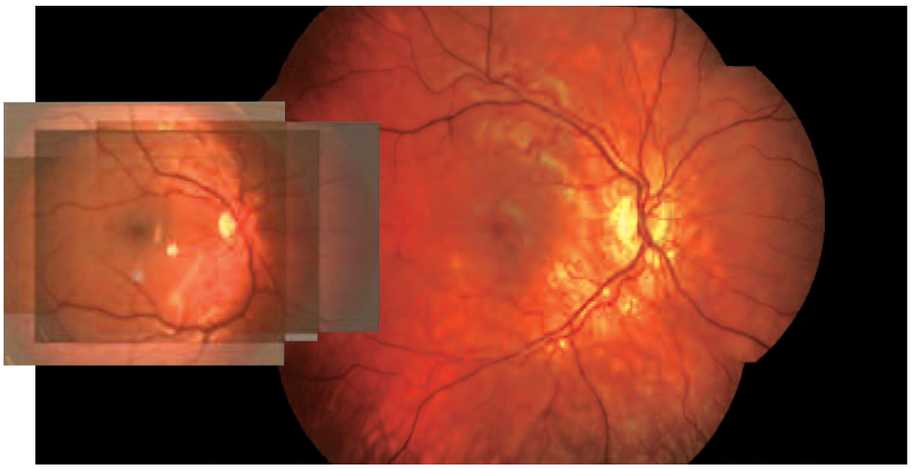


RTA 5 Benefit Summary The highly versatile RTA 5 delivers comprehensive diagnosis of glaucoma, diabetic retinopathy, age related macular degeneration, and many other retinal pathologies – with speed, accuracy, and an intuitive user interface. Patients and practices benefit from RTA 5 capabilities, such as:

- Up to 72° x 60° digital fundus Images at 9.4 mega pixel resolution
- Actual SLO, B-scan slit images less than 0.7 degrees apart
- Retinal thickness analysis at 1,400 - 3,200 data points
- 2D and 3D retinal thickness maps
- Dynamic 3D Anatomy Imaging through all scan volumes at real slit sections
- Retinal nerve fiber layer (RNFL) cross-section charts with temporal-to-temporal TSNIT Analysis
- Peripapillary and optic nerve head (ONH) analysis with rim/cup measurement
- Automated progression analysis with deviation probability reporting
- Non-mydriatic capability (with 3+mm pupils)
- Remote viewer software for analysis and patient consultations
- EMR compatible

No other single system combines SLO technology with fundus imaging to deliver the variety of testing modalities and corroborative diagnostic perspectives at such value.

Comprehensive Fundus Image Acquisition In 0.33 - 0.48 seconds, the RTA 5 simultaneously captures high resolution digital fundus images with each series of SLO scans of the full posterior pole. The result is a 72° x 60° Wide Field or 60° x 40° Standard Field image, at up to 9.4 mega pixel resolution.

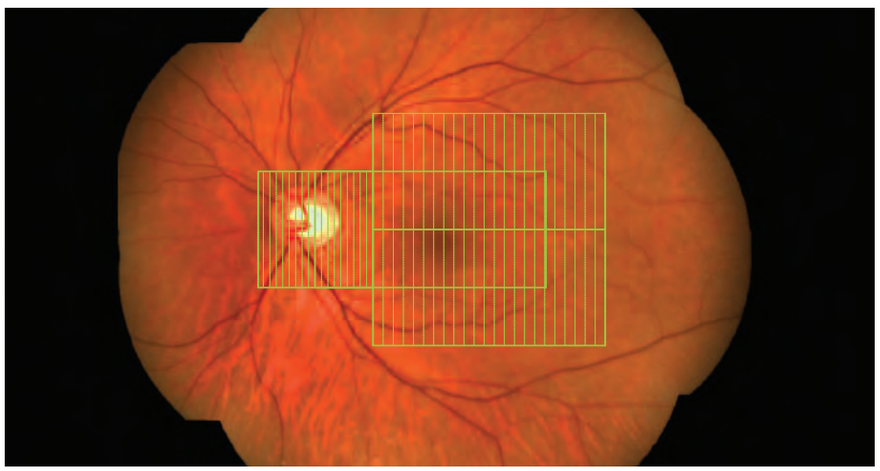


The RTA 5 exam is fast and easy to perform. The automatic alignment of the fundus images produce great results and the subsequent layers of additional data provides invaluable information with minimum subjectivity.

Automatic Registration of Fundus Images Utilizing a proprietary registration algorithm, the RTA 5 automatically aligns each image based on the patient's vascular patterns for enhanced accuracy and repeatability. This feature ensures reliable follow-up examination results without full dependence on consistent patient fixation.

SLO Grid and Scan Patterns

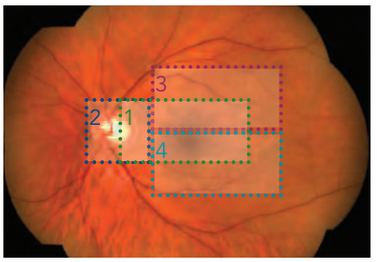
Only the RTA 5 incorporates proven SLO technology to capture real data in a variety of tight grid patterns including Standard Field (scans 1- 4), Expanded Peripapillary Fields (scans 1- 6), plus up to four optional 10° x 10° mm, selectively placed User Defined custom fields (scans 7- 10).

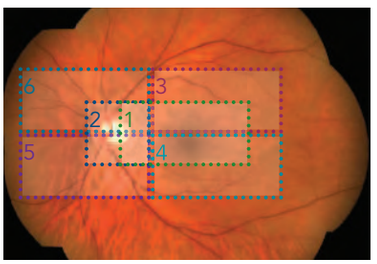


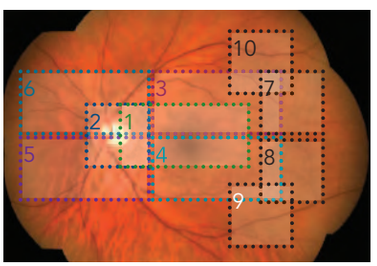
High Speed Scanning

The RTA 5 Standard examination includes three scans of the macula, each composed of twenty-four slit images per 20° x 10° area, plus one 10° x 10° scan of the ONH/disc composed of sixteen slit images. Scan times are just 0.48 seconds (macula) or 0.33 (ONH) and are essentially unaffected by eye movements. The collective 88 min./200 max. slits are separated by an average of 0.7 degrees to generate 1,408 min./3,200 max. real retinal thickness samples. Such scan density ensures minimum interpolation of data.

Broad scanning areas minimize examination time, reduce the number of composite retinal images and enhance overall data integrity. Within moments, exceptional photo documentation and quantitative results are available for viewing, printing, and sharing with patients and other clinicians.







Scan Sequences and Patterns:

1 Scan 1: Macula
6 x 3 mm, 24 slits, 384 data points

2 Scan 2: ONH/Disc
3 x 3 mm, 16 slits, 256 data points

3 Scan 3: Superior Macula/Perimacula
6 x 3 mm, 24 slits, 384 data points

4 Scan 4: Inferior Macula/Perimacula
6 x 3 mm, 24 slits, 384 data points

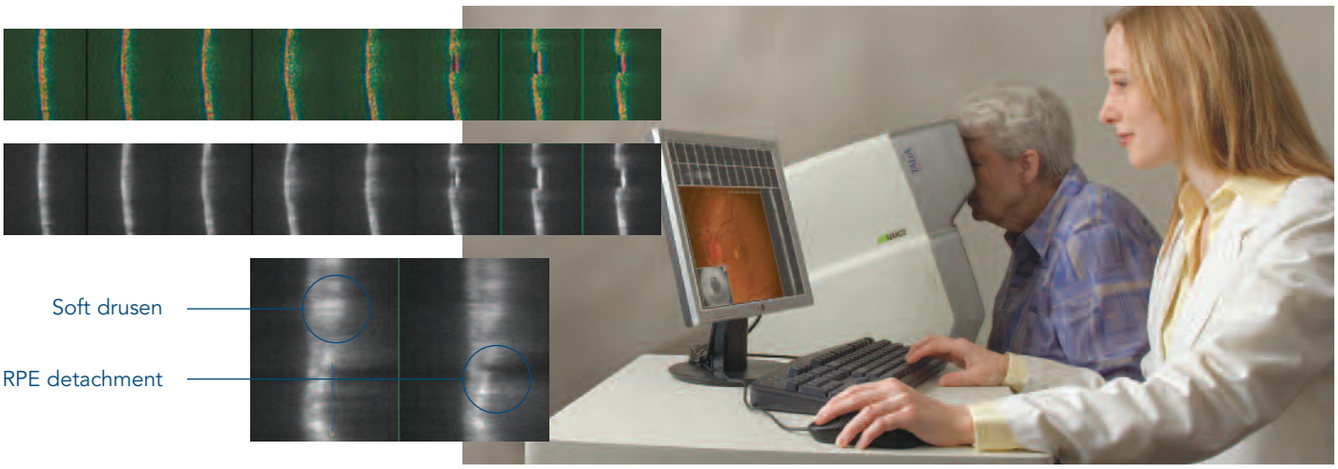
5 Scan 5: Inferior ONH/Peripapillary
6 x 3 mm, 24 slits, 384 data points

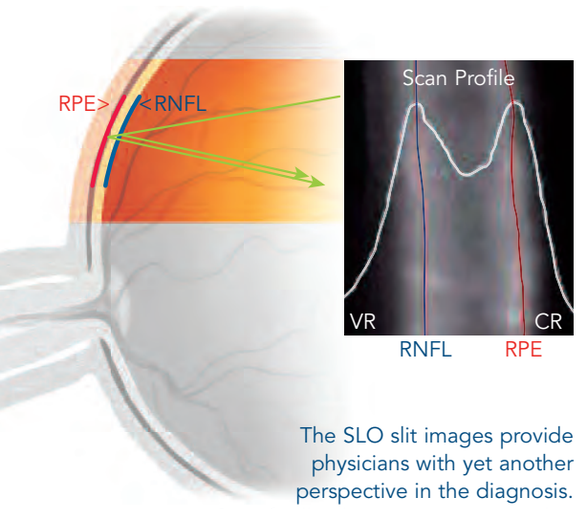
6 Scan 6: Superior ONH/Peripapillary
6 x 3 mm, 24 slits, 384 data points

7-10 Scans 7-10 (options):
User Defined placement
3 x 3 mm, 16 slits, 256 data points each

SLO Slit Images, Retinal Thickness, and Topography

The RTA 5 provides an automatic presentation of all actual, individual slit images within a given scan. Slit images cross-section the retina along a tight vertical grid making it possible to evaluate false-positive artifact and identify real pathology during an examination. Additionally, a quality assessment (QA) score reflects SLO slit integrity for increased user confidence in the validity of the results.





The SLO slit images provide physicians with yet another perspective in the diagnosis. Specifically, slit sections are critical in visualizing the difference between macular edema, cystoid formations, and RPE detachments – all which similarly appear as elevations in simple fundus observation or photography.

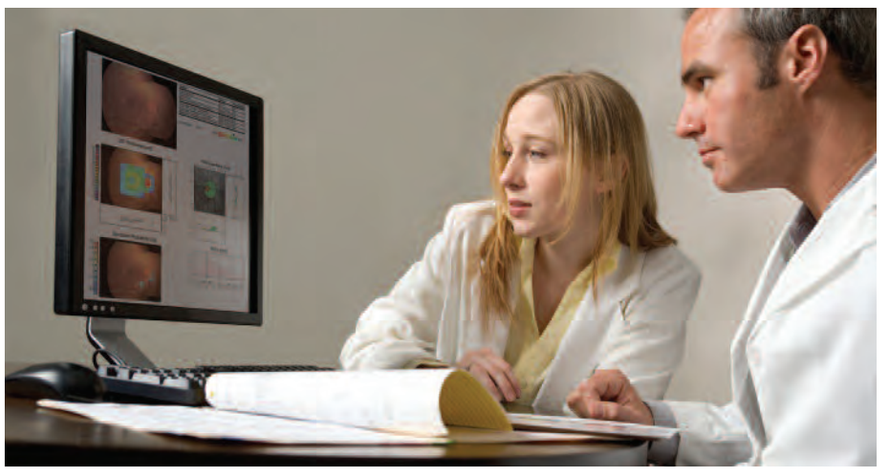
Quantitative Stereometric Measurement

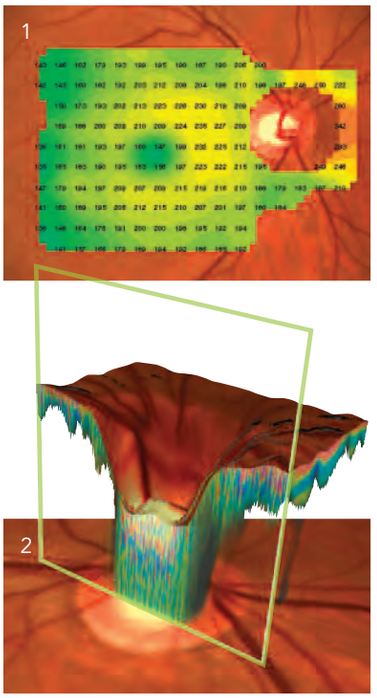
The RTA 5 projects narrow (solid state 532 nm), laser light onto and through the retina, harvesting reflectance between the vitreoretinal and chorioretinal interfaces. A thickness algorithm identifies the location of the anterior (RNFL) and posterior (RPE) retinal borders where the laser light is fully absorbed. Average retinal thickness is determined at sixteen points along each vertical slit.

The RTA 5 combines 25,000 A-scans in the final B-scan slit images – presented in color and grayscale modes. This unique density of data provides more accurate analysis of thickness changes and pathology structure across the macula and ONH.

Fundus Imaging and SLO

The RTA 5 delivers the most extensive diagnostic options available in a single retinal imaging instrument. With high resolution fundus images as its foundation, the RTA 5 utilizes SLO slit sections to overlay powerful quantitative retinal data, for comprehensive assessments of ocular pathology.



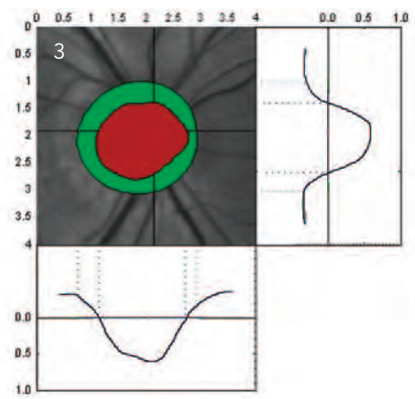


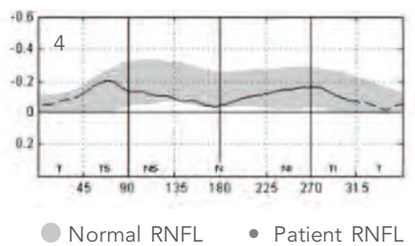
Multiple Diagnostic Modalities

The RTA 5 generates and overlays quantitative data including 2D retinal thickness maps layered with averaged numeric retinal thickness values (1) and dynamic 3D Anatomy Images (2).

In addition to structural analysis of the optic nerve head, the RTA 5 provides rim/cup area maps (3) with corresponding cross-section charts of the RNFL and 360° TSNIT surface height profile data (4).

All test results are automatically and instantly oriented to their specific position on the fundus image of the retina for increased ease of use and diagnostic value.

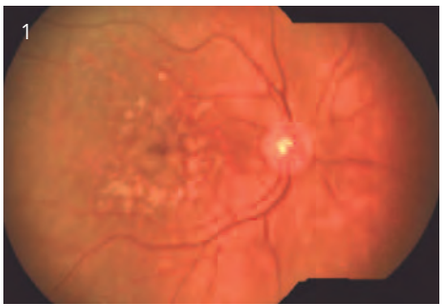


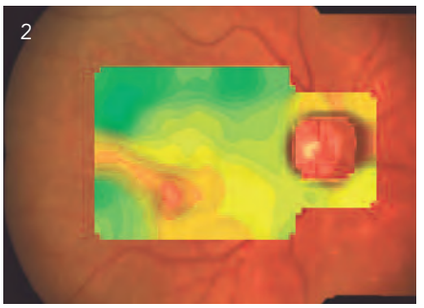


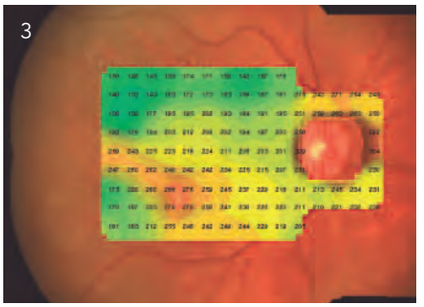
Automated Data Integration

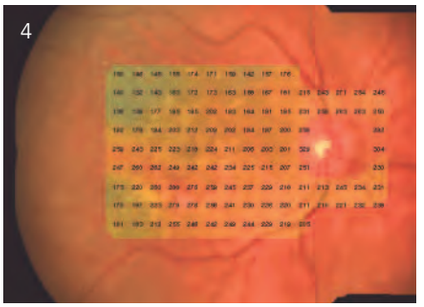
Multiple imaging perspectives of pathology increase confidence in diagnostic validity. The RTA 5 automated vascular image alignment and tilt correction software makes it easy to obtain uncompromised composite images through the complete posterior pole. This precise registration methodology layers a variety of quantitative diagnostic measurement options onto a digital fundus image foundation – at exact retinal marker locations.

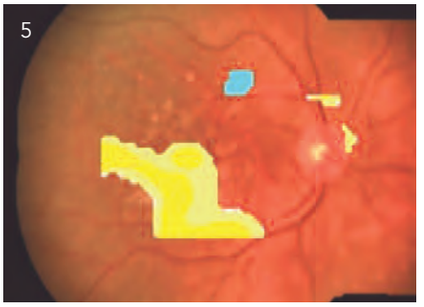
Even the highest resolution fundus photo is not sufficient for diagnostic assurance. The RTA 5 goes beyond fundus photography to provide the necessary quantitative thickness measurements which help accurately detect and define retinal pathologies.











2D and 3D Retinal Thickness Maps

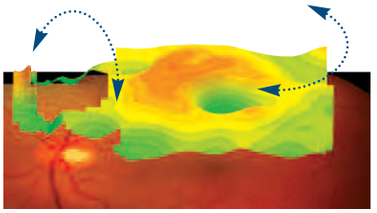
The RTA 5 empowers diagnostic capability by supplementing subjective fundus examinations. Fundus images (1) can be layered with a high density, color-coded 2D retinal thickness map (2) plus an averaged numeric retinal thickness values layer (3).

The 2D retinal thickness map layer can be modified using a transparency filter (4) to improve visualization of underlaying anatomical and pathology markers.

A color-coded deviation probability map layer (5) compares patient results to a large normative database and indicates statistically significant thickness variances. This data can be presented through the full macula, perimacular, and peripapillary regions for fine diagnostic discernment.

Interactive 3D Thickness Maps

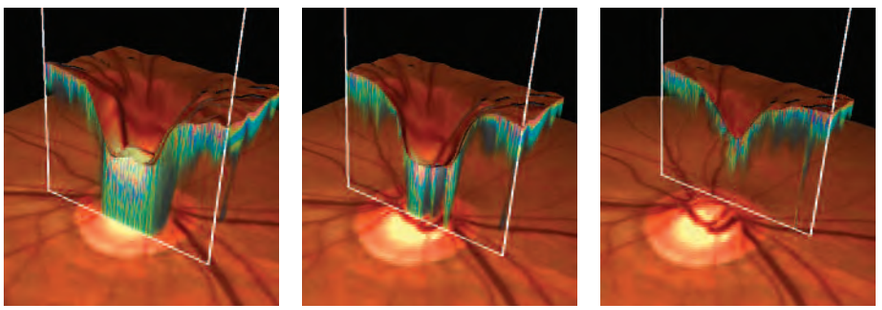
RTA 5 rotational and interactive 3D topography modeling capability is ideal for identifying pathology and evaluating therapeutic treatments. This perspective also serves as a powerful patient education tool which provides immediate appreciation of the high tech examination.



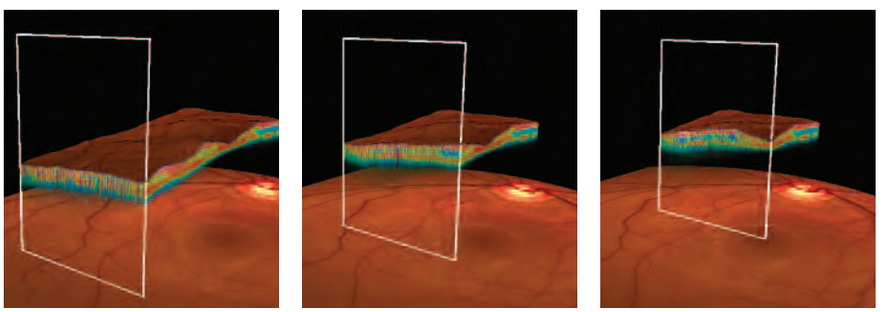
The 3D retinal thickness map remains exactly aligned on the fundus image as the perspective is manipulated 360° along any axis.

Dynamic 3D Anatomy Imaging

With the RTA 5, any scan area of the retina and disc can be presented as a volume. This elevated 3D image changes as the operator scrolls through each slit view – reflecting anatomic information corresponding with the fundus image. This interactive feature enables free movement and assessment along three axes options. It is possible to pan, rotate, zoom, and slice the 3D volume for a revolutionary new perspective in imaging. Linear and angular measures can also be added to all volume sections, that may be saved in the patient file, for follow-up analysis. Optional red-free images may be employed to further resolve embedded pathologies.



A series of three (out of sixteen) 3D Anatomy Images of the optic nerve head, through the 10° x 10° scan #2. The full 3 x 3 mm volume traverses the complete nerve head.

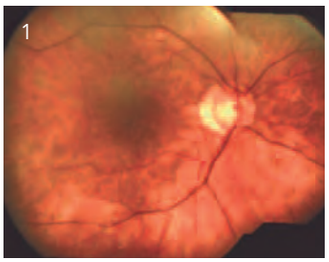


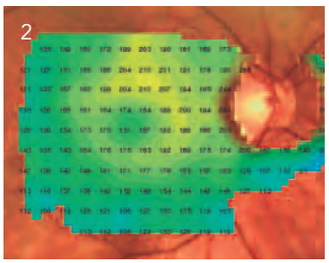
A series of three (of twenty-four) 3D Anatomy Images of the superior perimacula, through the 20° x 10° scan #3. The full 6 x 3 mm volume traverses the superior half of the macula/fovea.

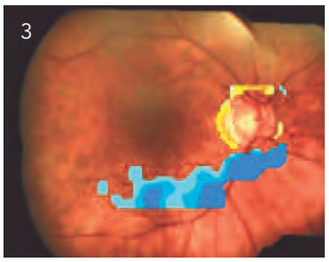
Visual Aide

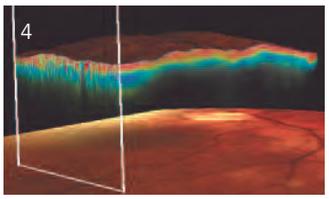
3D images not only offer exceptional diagnostic insight, they facilitate effective patient education and physician communication. Images can be saved as individual screen captures or as dynamic video sessions (in .avi format) for powerful presentation or collaboration.

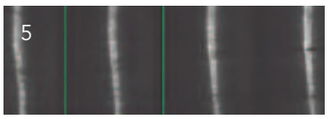
Glaucoma It has been clinically shown that individual measurements, such as IOP and CD ratios, are insufficient in isolation for early glaucoma detection. Only a composite of multiple diagnostic parameters provides full disease diagnosis. The comprehensive capabilities, of the RTA5, illuminate both ONH/peripapillary structural changes and early ganglion cell loss at the macula/perimacula – making it essential for early glaucoma detection and management.

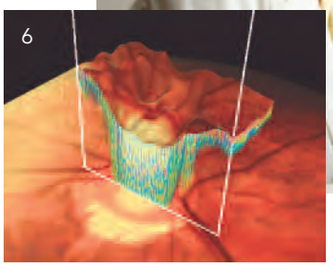


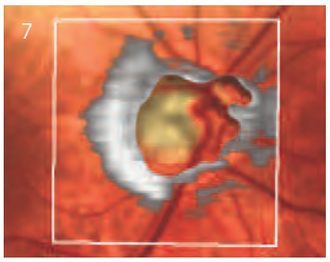


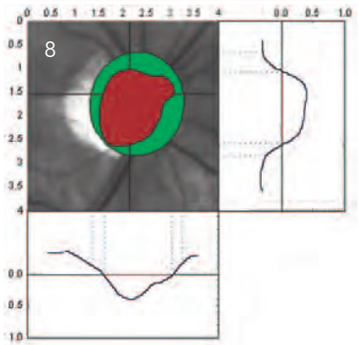


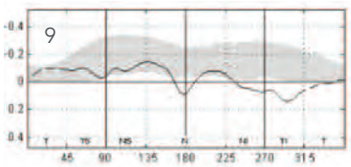












Classic Glaucoma Presentation

The fundus image (1) indicates thinning across the macula with pronounced cup formation in this classic peripapillary atrophy example.

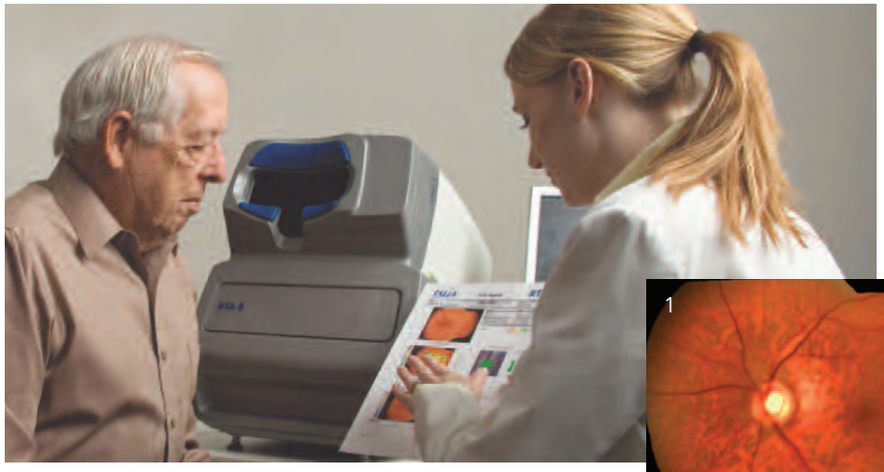
The 2D numeric retinal thickness map (2) quantifies depression through the ganglion crescent and diminished thickness in the inferior fundus. The normative deviation probability map (3) mirrors the area of perimacular and peripapillary thinning (represented in blue).

The 3D Anatomy Image of the perimacular field (4) correlates exactly with the individual B-scan slit images (5) which appear thin compared to normal.

Temporal-to-nasal (6) and RNFL-to-RPE (7) 3D Anatomy Image selections provide clear insight to structural changes at the ONH.

The rim/cup area map (8) shows a large cup with notching supported by temporal/temporal inferior rim tissue loss as seen in the RNFL cross section chart (9).

Glaucoma Early glaucoma patients do not always display symptoms at both the nerve head and the macula. Even when traditional indicators such as intraocular pressure, fundus image, CD ratio, and ONH angle appear unremarkable, the RTA 5 can detect and quantify peripapillary atrophy and macular thinning. The comprehensive RTA 5 diagnostics allow detection of glaucoma at all stages.



Glaucomatous Nerve Fiber Loss

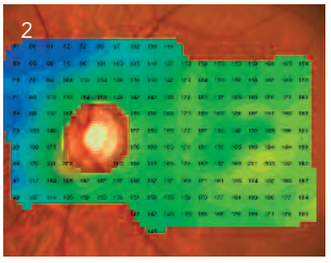
The fundus image (1) shows a fairly steep cup but overall normal structure. Significant nerve fiber loss encroaching into the nasal macula is evident on the 2D retinal thickness map with numeric retinal thickness values overlay (2).

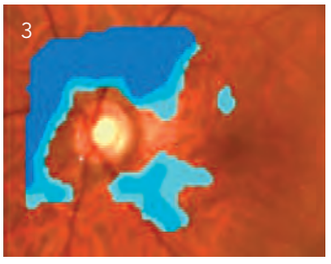
The deviation probability map (3) highlights statistically significant reduced retinal thickness.

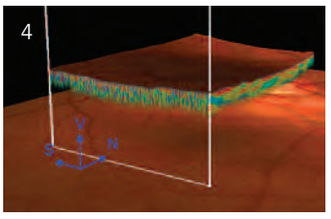
Retinal thinning is confirmed in the 3D Anatomy Image (4) and B-scan slit images (5).

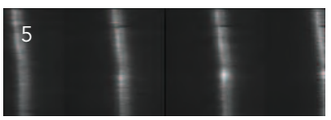
Another 3D Anatomy Image (6) provides structural analysis of the nerve head. Linear and angular measures can be added to the 3D Anatomy Image (7) to help assess future anatomical changes at the disc.

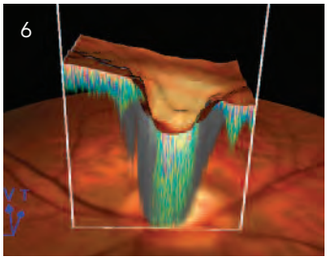
Although the CD ratio shown on the rim/cup area map (8) appears unremarkable, the corresponding RNFL cross section chart (9) shows depression at the lowest margin of the normative band.

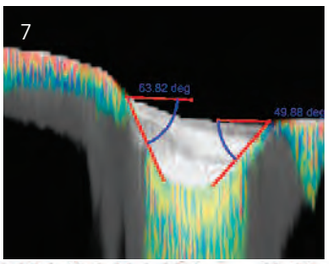


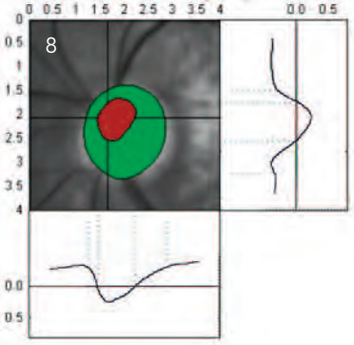


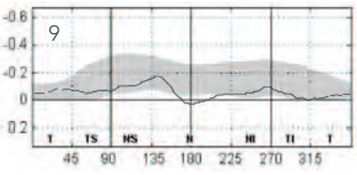






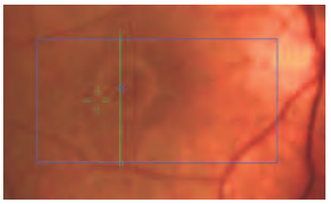




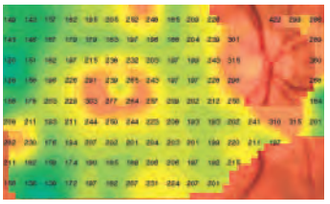


AMD with Macular Hole

The RTA 5 can detect early dry and wet AMD. Indicators such as exudates, drusen and sub-macular neovascularization or conditions such as retinal traction, tears, and holes can be identified, measured, and monitored using a variety of RTA 5 test modalities.



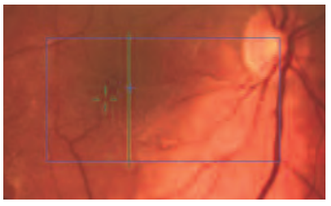
The scan area (blue box) and slit position (green line) identify the exact location of the macular hole.



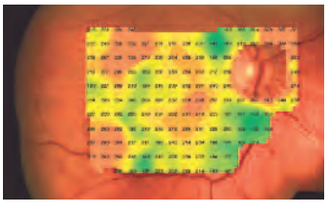
The fundus image with numeric retinal thickness map clearly shows and quantifies foveal rim elevations.

Epiretinal Membrane

The RTA 5 is extremely effective for detecting subtle changes. Even early stage membranes still adhered to retinal ILM (which are often asymptomatic and create only slight reduction in visual acuity) can be detected and defined by the RTA 5.



The subtle epiretinal membrane edge (faint white line) is marked at the slit indicator (blue crosshair).

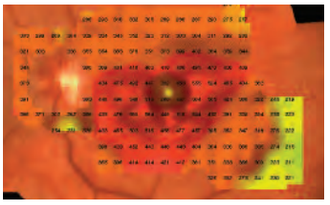


Irregular, localized thickening of the fovea and perifoveal retina are identified and quantified on the fundus image with 2D Map and numeric retinal thickness values.

Diabetic Retinopathy

Microaneurysms, abnormal neovascularization, and hemorrhages associated with diabetic retinopathy, can be detected at the onset with the RTA 5. Additionally, the RTA 5 can delineate edematous thickening from PED and CME formation.

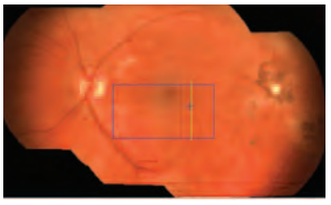
The fundus image shows neovascularization, hemorrhage, and areas of RPE loss through significant vitreous opacity.



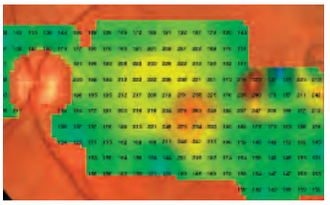
The 2D thickness map with numeric values layer shows and quantifies a massive area of central retinal thickening, exceeding normative ranges.

Central Serous Retinopathy

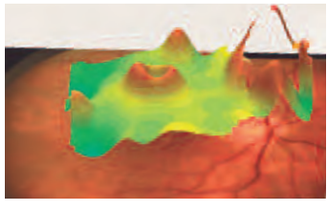
The RTA 5 can trace small RPE breaks, retinal swelling and chorioretinal interface changes. Plus, RTA 5 Progression Analysis provides accurate, essential quantification of CSR regression.



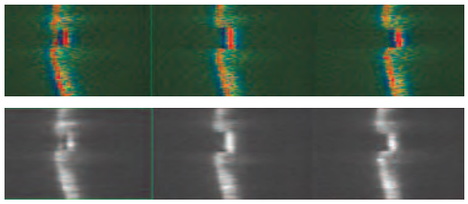
User defined scan areas were added to the standard field exam to produce a fundus image which captures perimacular thickening.



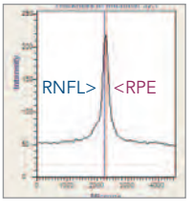
The 2D thickness map with numeric values layer shows and quantifies two areas of significant thickening.



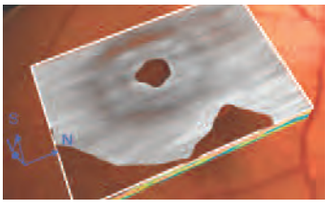
A 3D retinal thickness map layered on the fundus image shows the defined macular hole. This perspective can be rotated at any axis for best viewing.



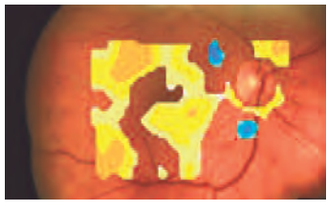
B-scan slit images, in color and grayscale modes, indicate a central macular hole with peripheral cystoid formation.



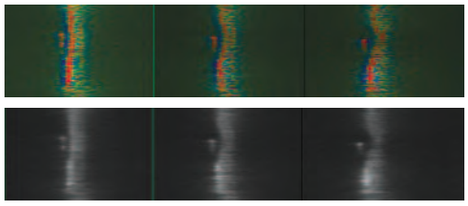
An A-scan graph indicates 32.1µm localized compression between the RNFL and RPE.



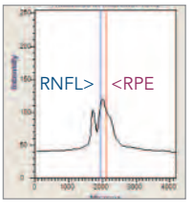
A RNFL to RPE 3D Anatomy Image defines the macular hole structure and enhance the comprehensive diagnosis of macular degeneration.



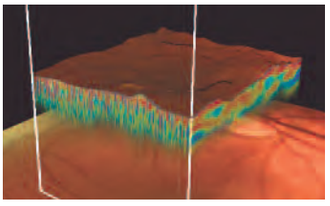
The pathology area is highlighted on the layered normative deviation probability map. The ERM is seen as yellow elevation and normative deviation.



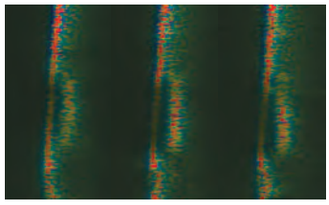
Fibrin development at the vitreoretinal interface is identified on slit images across the fovea.



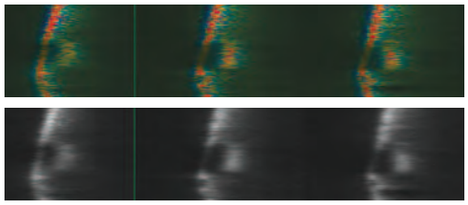
The ERM edge location is identified in the A-scan anterior to the RNFL reflection.



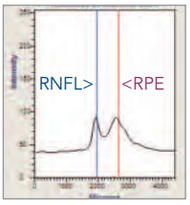
Scrolling through the fovea using 3D Anatomy Imaging, macular pucker and surface traction is apparent at the ERM margin.



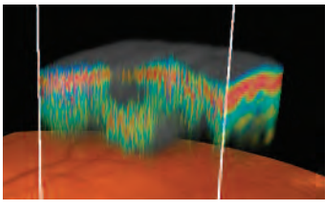
Elongated and magnified B-scan images prominently display intraretinal cystoid formation.



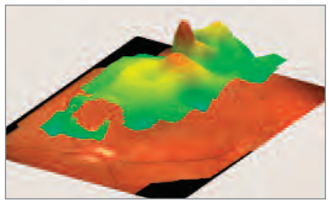
Slit images show pervasive edema and CME. In this case, the average perifoveal and foveal values are > 460µm - 350µm respectively.



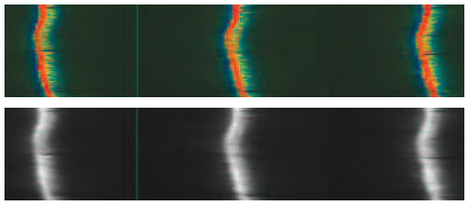
Cystoid formation is defined by an A-scan graph with 660µm separation between the RNFL and RPE.



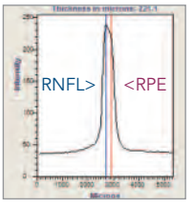
3D Anatomy Imaging confirms cystoid location, size, and complete span. The white box marks the retinal section location.



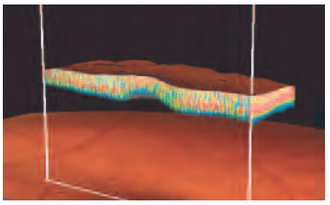
A 3D retinal thickness map layered on the fundus image is rotated to the best perspective to view localized areas of temporal elevations.



Slit images display an extended area of perimacular thickening and separation at the chorioretinal interface.

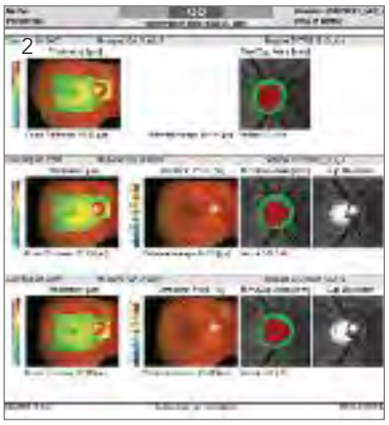


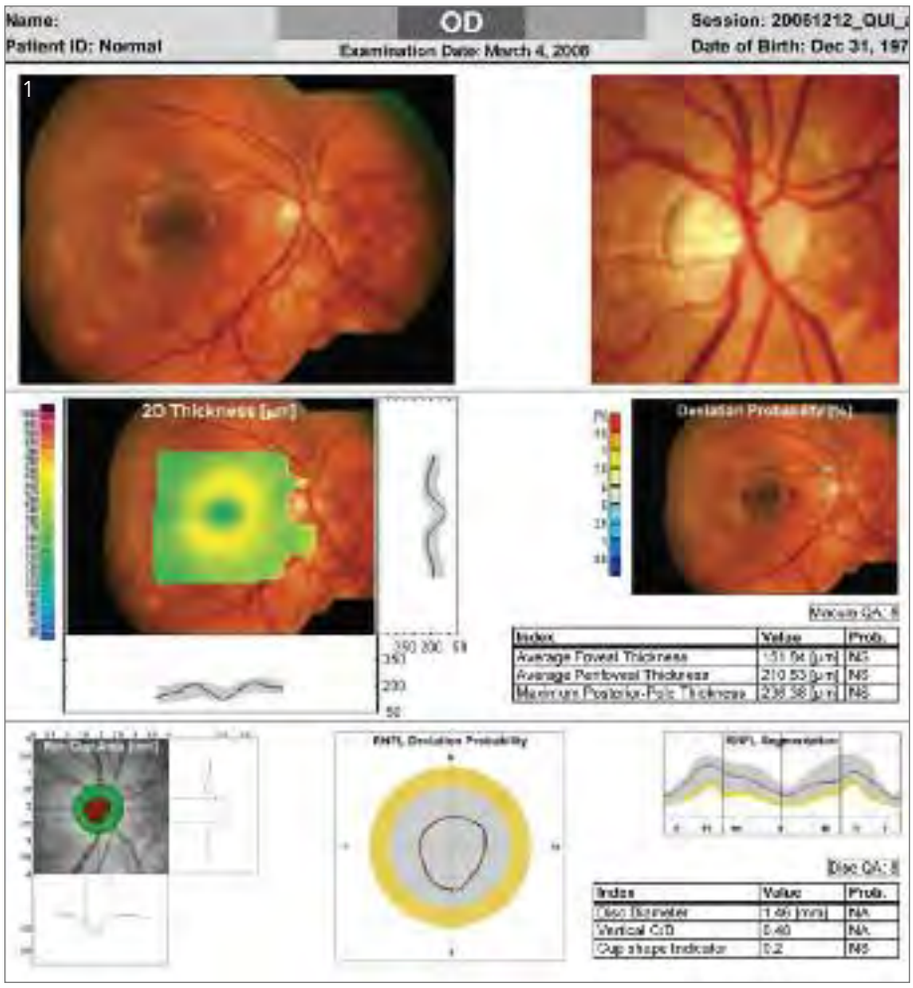
A-scan shows normal retinal thickness – not full thickness edema.



Dynamic 3D Anatomy Imaging corresponds with slit images, 2D, and 3D retinal thickness maps – indicating elevation in this CSR patient.

The RTA 5 provides practice building opportunities with multiple CPT reimbursable testing options for retina scanning and fundus imaging in baseline and follow-up reports. Additionally, an elective Vision Wellness Screening test is available.





1. RTA 5 Baseline Report For Detection The RTA 5 Report reveals essential data for early disease detection at the macula and ONH – complete with normative comparisons. RTA 5 Report graphics include fundus image, retinal thickness, thickness deviation probability, disc topography, and TSNIT surface height profile data.

2. Follow Up Report For Progression Analysis Proprietary RTA 5 automatic image registration minimizes reliance on perfect patient fixation and enhances repeatability for more accurate comparisons over time. Change over time is reported in macular thickness and ONH structure.

3. Vision Wellness Report The unique RTA 5 Vision Wellness Exam expands practice capabilities and revenue generating opportunities by allowing practitioners to offer patients an elective examination that provides patients with an assessment of retinal and ONH health. This non-mydriatic (3mm+ pupil) examination is fast, easy, and comfortable for patients. It provides early disease screening, establishes a baseline profile, facilitates patient education, and helps position the practice as a leading primary eye care facility.

RTA 5

Fundus | Macula | RNFL | ONH | Disc

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Fundus | Macula | RNFL | ONH | Disc

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