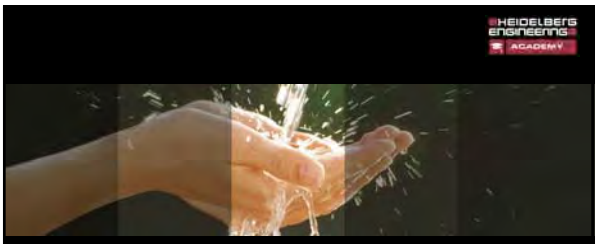

Glaucoma with the SPECTRALIS

Christopher Wong, CRA
National Imaging Specialist
Heidelberg Engineering, Inc.

Agenda

- Structural Changes From Glaucoma
- How Glaucoma Is Assessed With Imaging
- SPECTRALIS Scans
  - Importance Of Tracking
  - Circle Scan
    - Acquisition
    - Viewing
  - Posterior Pole Scan
    - Acquisition
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  - Glaucoma Module Premium Edition
  - Printouts

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Ganglion Cell and Axon Orientation in Retina

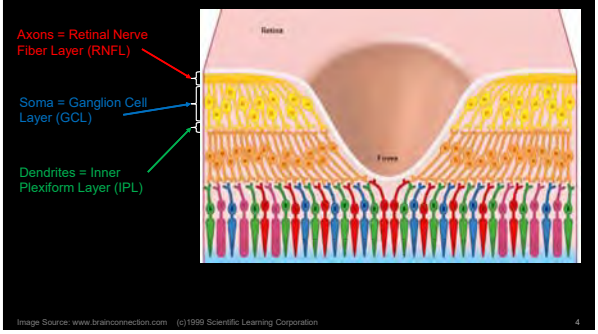

Image Source: www.brainconnection.com (c)1999 Scientific Learning Corporation

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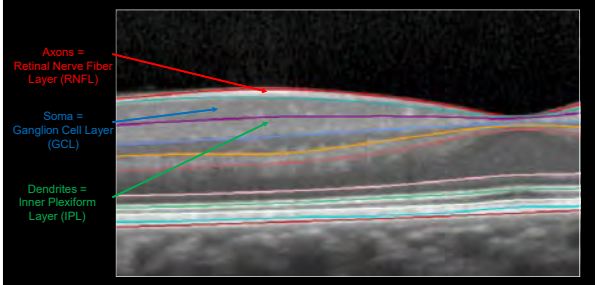
Retinal Layers Visualized with SPECTRALIS



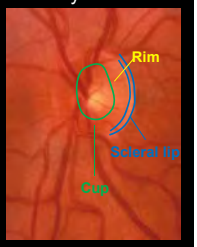
5

Information Pathway Visualized with OCT

6

ONH Anatomy

- ONH is the location where RNFL (axons) exit the eye to form the optic nerve
- The anterior surface of the ONH is the clinically visible optic disc
- After reaching the scleral lip (edge of disc), the nerve fibers arrange themselves by forming the neuroretinal rim
- The space not occupied by nerve tissue is called the optic cup



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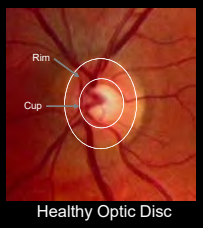
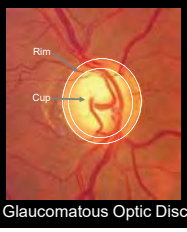
Assessment – Color Photos - Neuroretinal Rim

- Major indicator of the ONH health = neuroretinal rim (RGC axons)
- How is neuroretinal rim tissue assessed clinically?
  - Borders of rim tissue must be identified (disc and cup margin)
  - Amount of rim tissue must be quantified (cup-to-disc ratio)



Healthy Optic Disc



Glaucomatous Optic Disc

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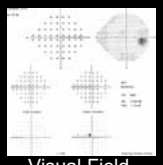
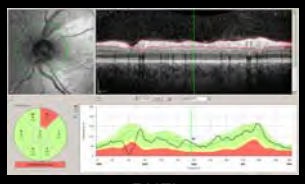
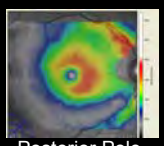
Assessment



Visual Field



RNFL



Posterior Pole

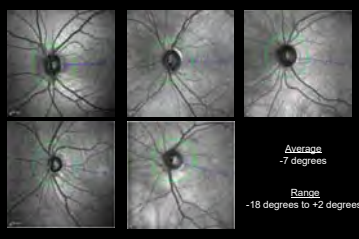
10

Accurate Anatomical Orientation of Scans

11

Anatomic Variation: Fovea Position Relative vs. ONH

- In most eyes, fovea is located below the level of the center of BMO
- Inter-subject variability in the axis connecting the fovea and BMO is large[1,2]



Average
-7 degrees

Range
-18 degrees to +2 degrees

1. Lamparter J, Russell, RA, Zhu H, et al. The influence of intersubject variability in ocular anatomical variables on the mapping of retinal locations to the retinal nerve fiber layer and optic nerve head. Invest Ophthalmol Vis Sci. 2013 Sep 9;54(9):6074-82. PMID: 23882689
2. Chauhan BC, Burgoyne CF. From clinical examination of the optic disc to clinical assessment of the optic nerve head: a paradigm change

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Circle Scan Acquisition

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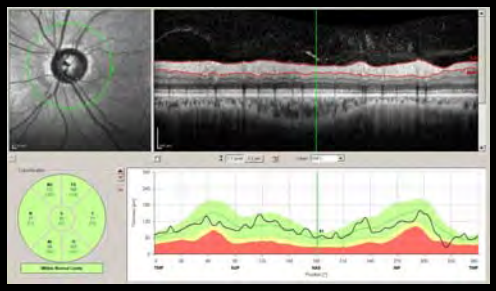
Circle Scan Viewing



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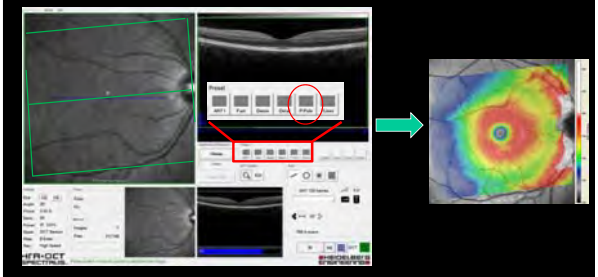
Posterior Pole Acquisition



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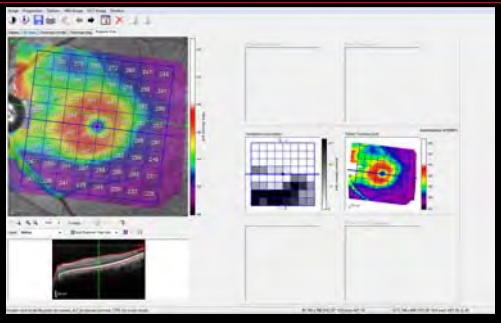
Posterior Pole Viewing – Grid Adjustment



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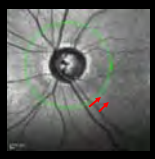
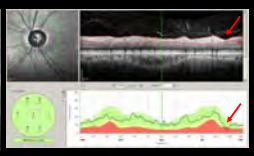
Case – Thickness Map Confirmation

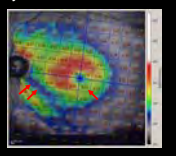
The infrared image shows a hint of discoloration, but does not clearly indicate thinning.

The RNFL - OCT shows thinning in the inferior temporal area on the thickness graph but the defect is not significant enough to trigger the sector classification

The posterior pole thickness map shows a clearly defined area of thinning in this inferior temporal area and thinning around the macula is not picked up by the other tests.







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Glaucoma Module Premium Edition: GMPE

The SPECTRALIS® Glaucoma Module Premium Edition combines the proprietary Anatomic Positioning System (APS) with a series of unique scan patterns to assess the optic nerve head, the retinal nerve fiber layer, and the ganglion cell layer. These scan patterns are precisely matched to the characteristics of fine anatomic structures relevant in glaucoma diagnostics.

The glaucoma module compares patients' eyes to a reference database of normal eyes, noting even very small deviations. The precision of the SPECTRALIS AutoRescan function allows confident identification and monitoring of structural changes from visit to visit.

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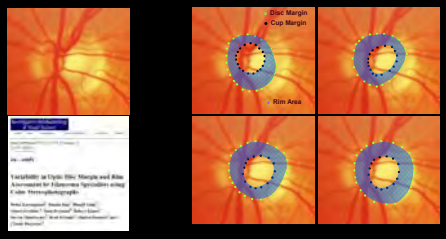
Clinical Assessment of Neuroretinal Rim is Variable



- Poor agreement on disc margin
- Poor agreement on cup margin
- Significant neuroretinal rim area discordance

Chauhan BC, Burgoyne CF. From clinical examination of the optic disc to clinical assessment of the optic nerve head: a paradigm change. Am J ophthalmol. 2013 Aug;156(2):218-227.

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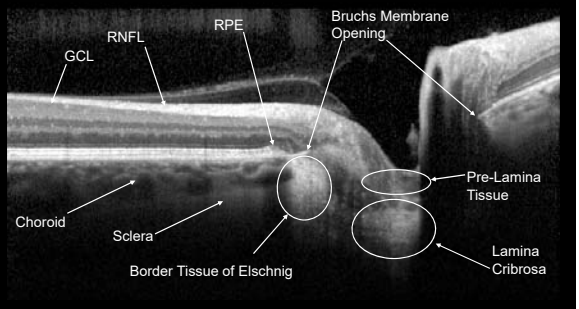
GPME: Anatomy Review



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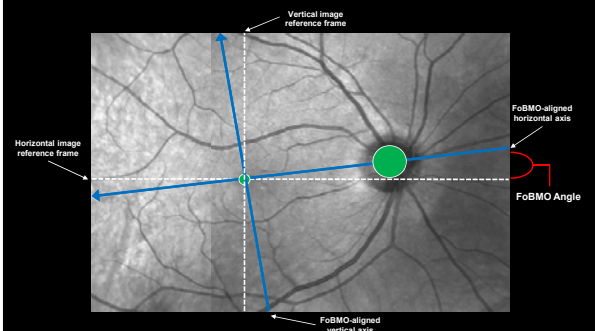
Imaging According to FoBMO Axis



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APS Scan – Identifying Landmarks

- 4 Easy Steps
  - Step 1 – Detecting the fovea position
  - Step 2 – Confirming the fovea position
  - Step 3 – Detecting the BMO center position
  - Step 4 – Confirming the BMO center position

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BMO – Objective Outer Edge of Rim

BMO can be consistently detected by SD-OCT imaging

But BMO is usually clinically and photographically invisible

- Clinical Disc Margin
- Bruch's Membrane Opening

Alexandre S.C. Reis, Glen P. Sharpa, Hongli Yang, Marcelo T. Nicolela, Claudia F. Burgoyne, Balwantray C. Chauhan. Optic disc margin anatomy in patients with glaucoma and normal controls with spectral domain optical coherence tomography. *Ophthalmology 2012; Apr;119(4):738-47*

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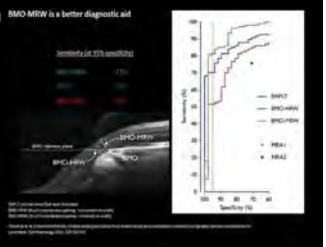
GMPE: BMO-MRW

- BMO: Bruch's Membrane Opening
  - The BMO is used as an anatomical reference point.
  - The BMO is located automatically.
- MRW: Minimum Rim Width
  - Shortest distance from BM to the ILM.
  - The MRW is automatically measured.



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SPECTRALIS GMPE: Accurate Anatomical Orientation of Scans

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SPECTRALIS GMPE: Acquisition Software - Scan Patterns

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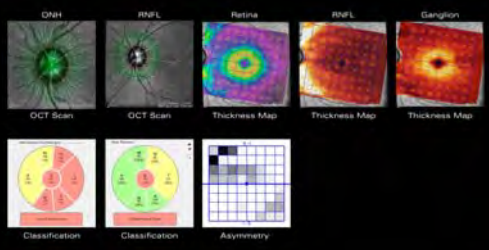
SPECTRALIS GMPE: Features and Functionalities



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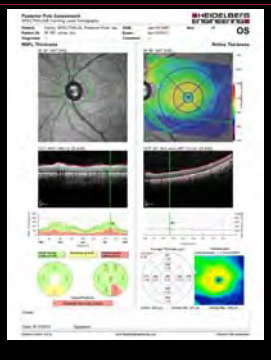
Printouts – Single Eye



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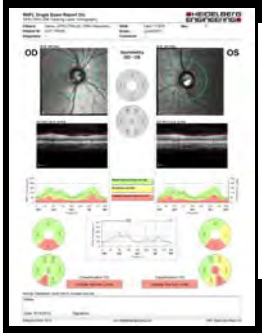
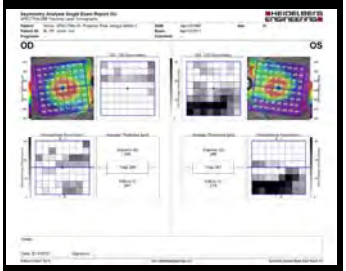
Printouts - OU





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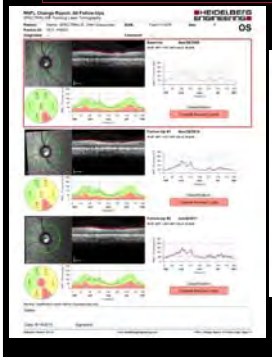
Printouts - Progression



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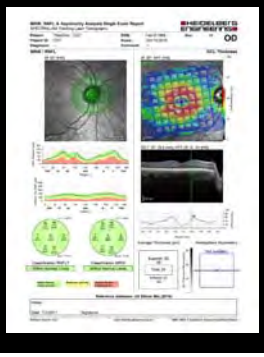
GMPE Printout: MRW, RNFL, Asymmetry Analysis



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Hands On - Tasks

- Capture an RNFL Scan
- Capture a Posterior Pole Scan
- Capture GMPE Scans
- Create Printouts

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