

Clinical Needs of Phantom

G. Wollstein, MD

Associate Professor
Director, Ophthalmic Imaging Research Laboratory
University of Pittsburgh

Financial Disclosure

- None

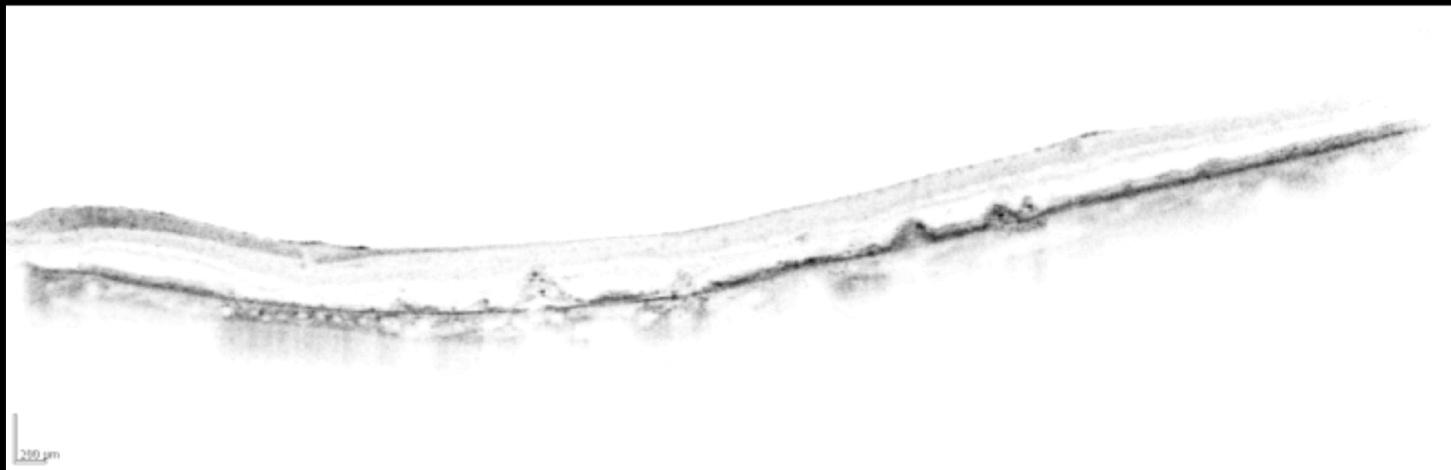
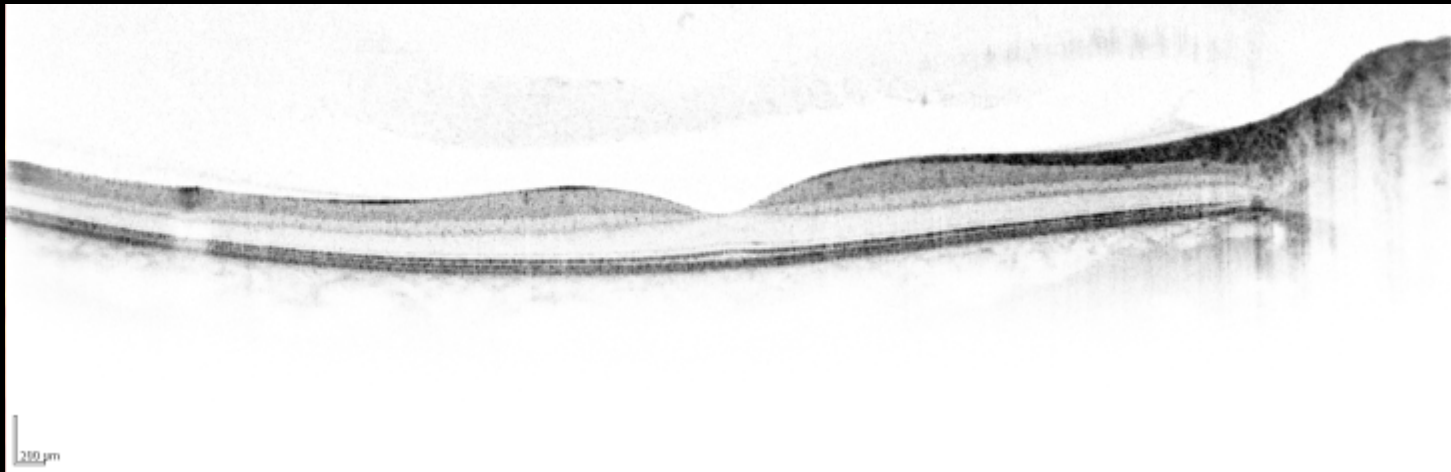
OCT

- Many clinical applications:
 - Ophthalmology
 - Dermatology
 - OB/GYN
 - Orthopedic surgery
 - Cardiology
 - Dentistry
 - Gastroenterology
 - Etc.

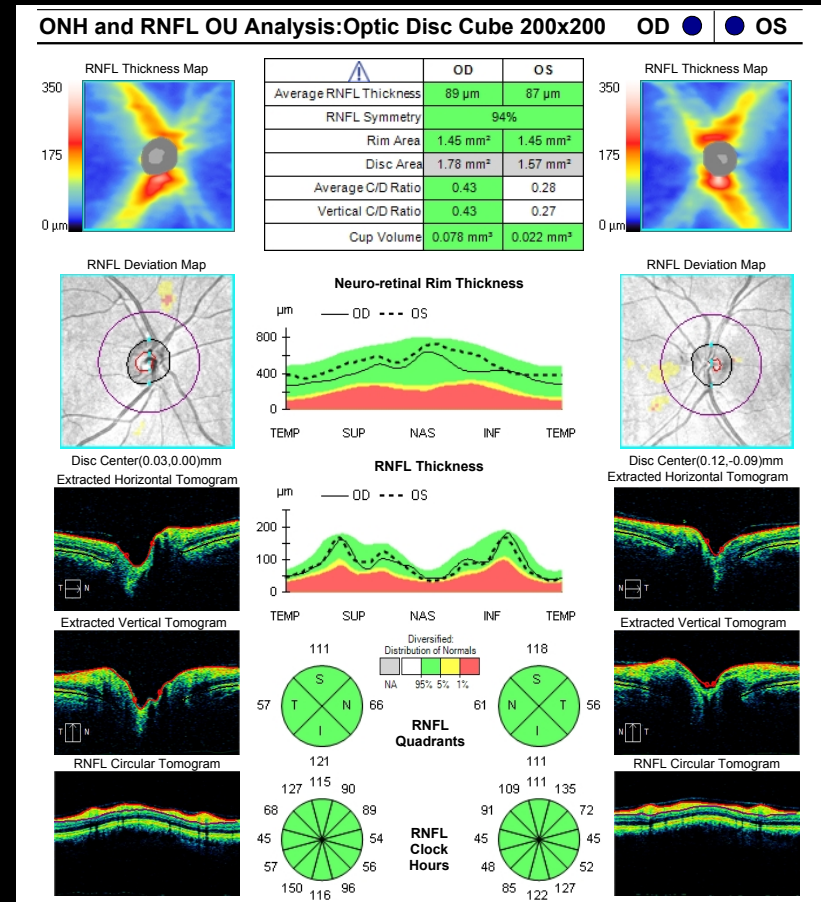
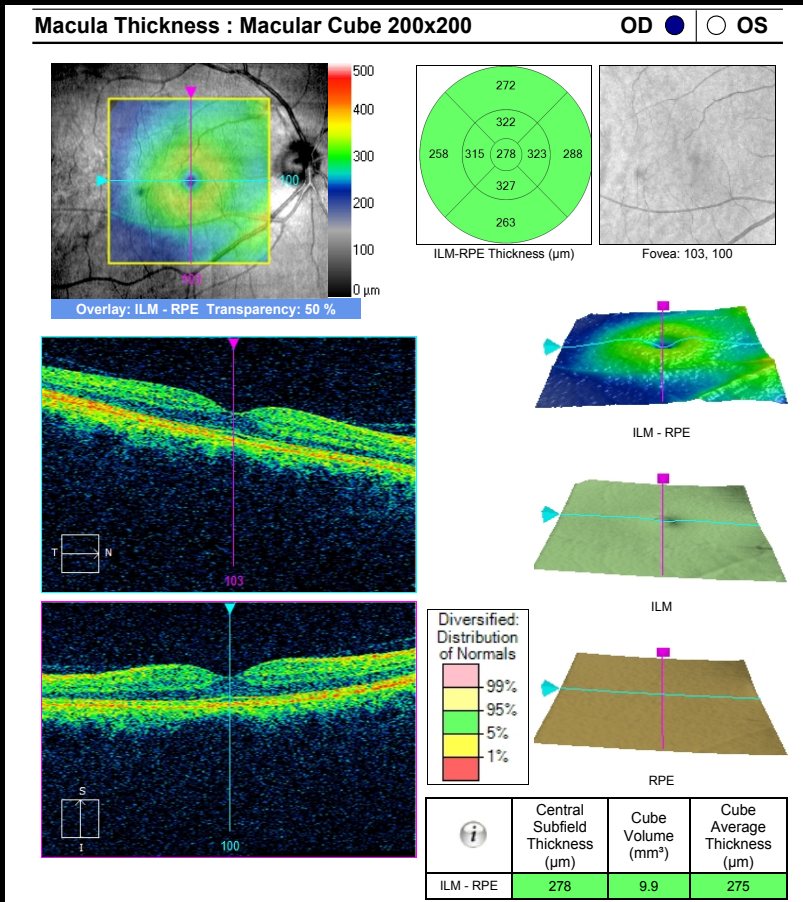
OCT and Ophthalmology

- Cornerstone testing in routine clinical evaluation
 - Age related macular degeneration
 - Glaucoma
 - Diabetic retinopathy
- Dictate clinical decisions

Qualitative Information



Quantitative Information



Glaucoma

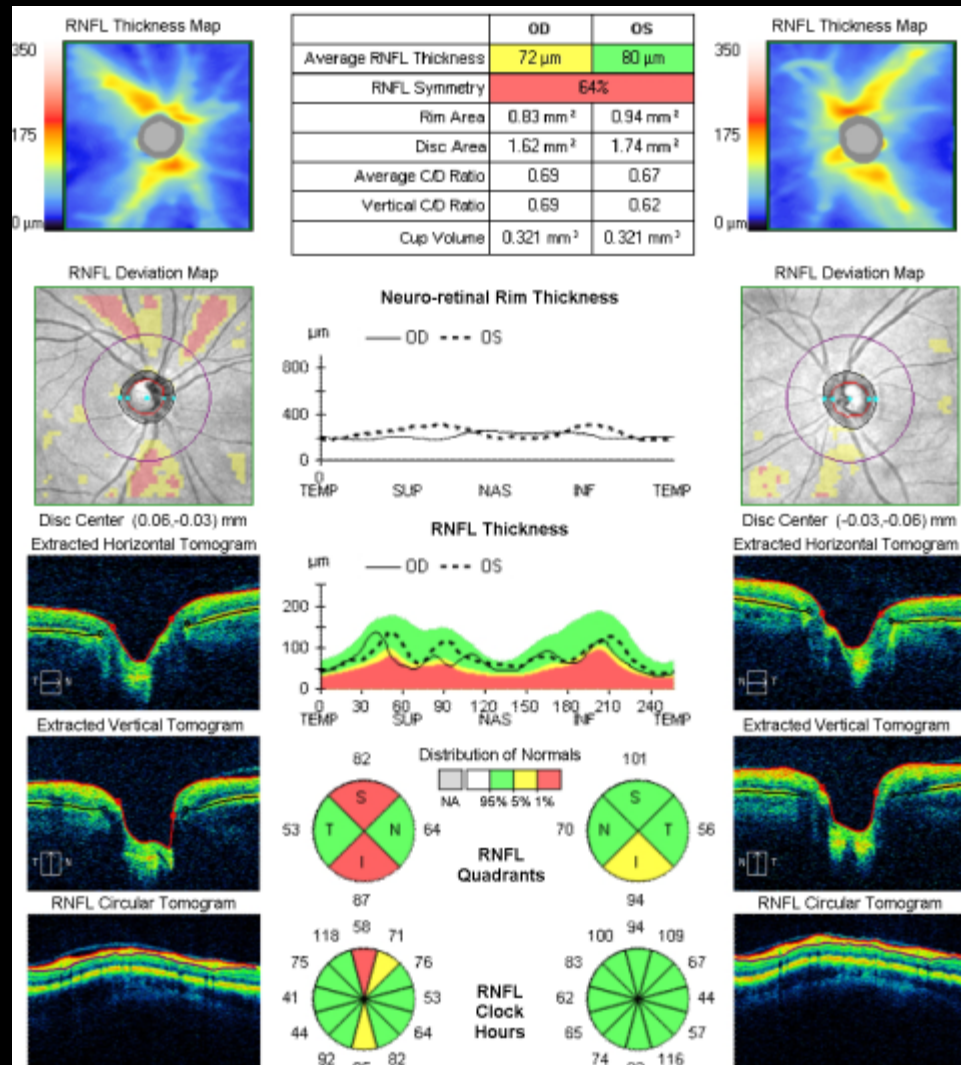
- Second leading cause of blindness
- Prevalence: ~2% of general population
- Mostly asymptomatic until late stage
- Gradual and irreversible neural loss
- Effective treatment to halt further damage is available

- Timely diagnosis is critical

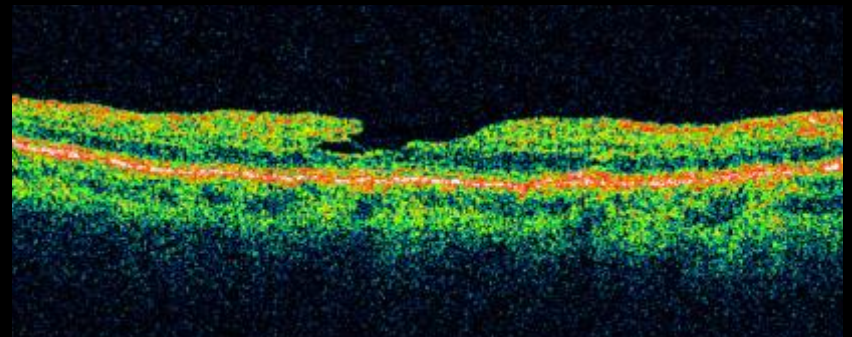
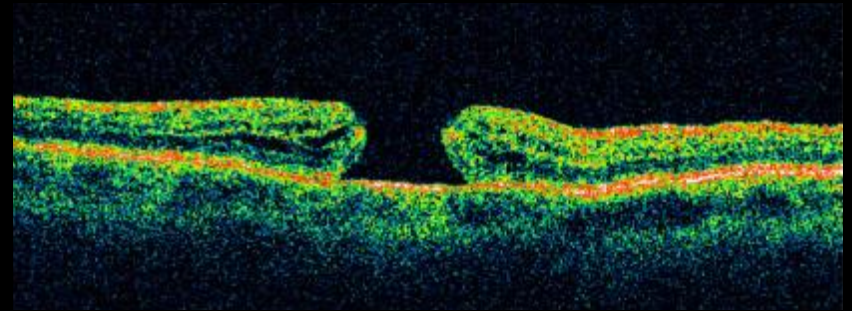
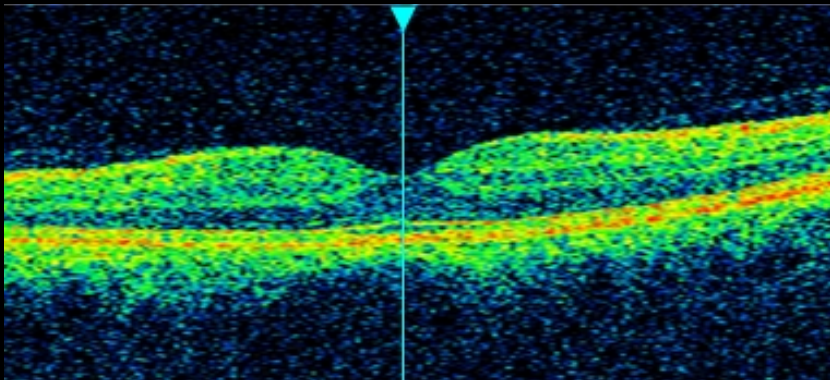
Glaucoma Diagnosis

- Detection of tissue loss in the posterior segment of the eye
 - Clinical evaluation
 - Subjective
 - Require expertise
 - Ocular imaging
 - Quantitative evaluation

Glaucoma vs. Healthy



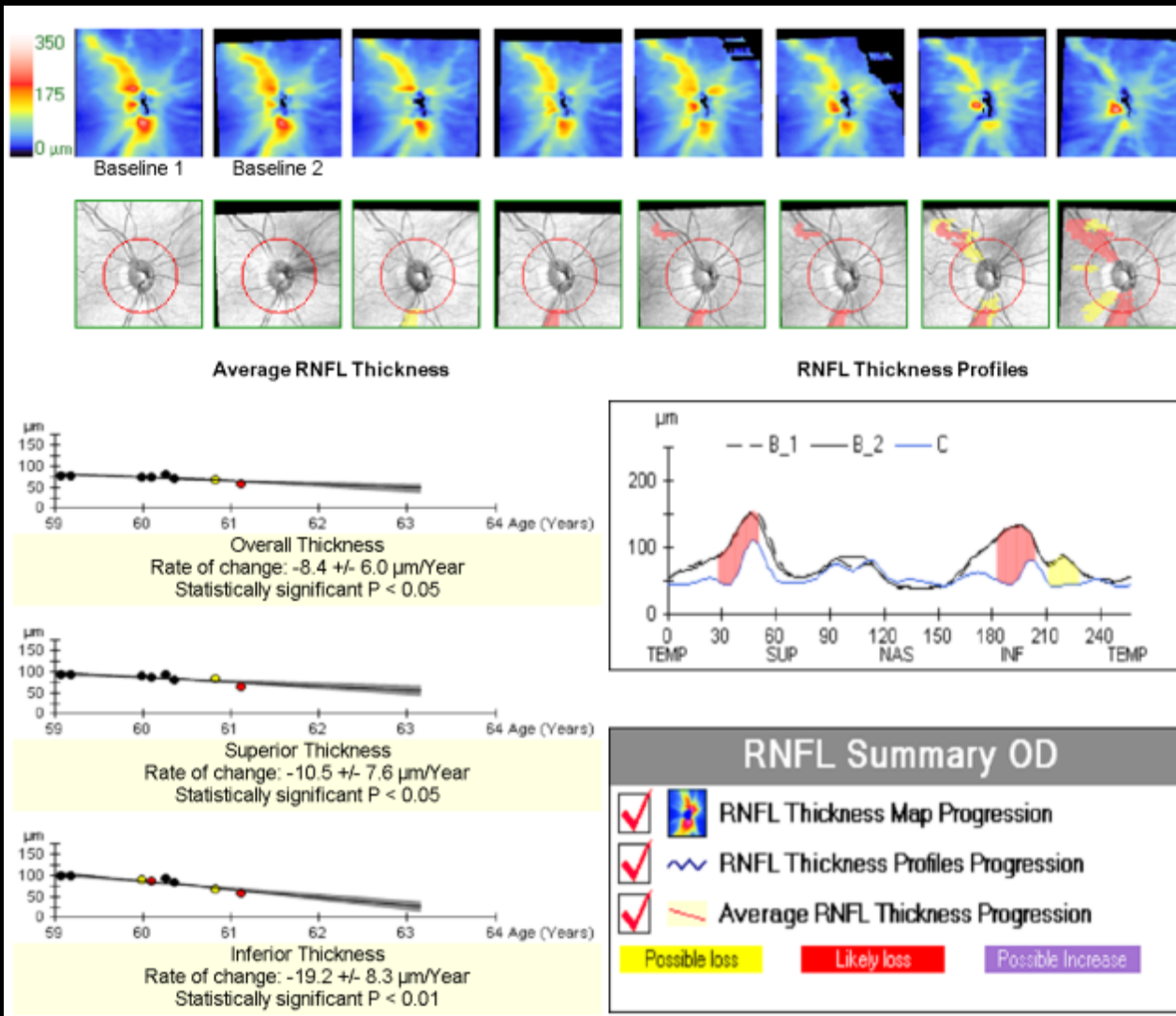
Healthy vs. Macular Hole



Longitudinal Assessment

- Worsening of disease
- Response to treatment

Longitudinal Report



SD-OCT



Differences Between Devices

- Systematic bias
- Wavelength
- Scan pattern
- Segmentation software
- Definition of boundaries

- Impossible to compare measurements acquired with different devices
 - Same manufacturer
 - Different manufacturer

We Need a Reliable Phantom

- We cannot put a ruler inside the living eye...
- Histology
 - Shrinking of the tissue during processing
 - Non-linear?
- Reproducibility study are insufficient
 - Consistently erroneous measurement?

OCT

- Many clinical applications:
 - Ophthalmology
 - Dermatology: Nevi
 - OB/GYN: Cervical lesions
 - Orthopedic surgery: Cartilage
 - Cardiology: Atheroma
 - Dentistry: Teeth decay
 - Gastroenterology: Polyps
 - Etc.

Clinical Needs of Phantom

- Calibration of devices
 - Across devices of the same manufacturer
 - Between manufacturer
 - Over time
- Reliable calibration equations between devices
- Determine the effect on measurements
 - Image quality
 - Scan pattern
 - Tilt

A reliable phantom is needed!



Thank You