Exploring the Globe with Technologies That Image a Mile Wide and a Mile Deep

Novel technologies lead to both early and new disease identification. EDI OCT and Multi-Spectral Imaging reveal disorders at various depths otherwise invisible. Panoramic autofluorescence reveals RPE defects not observable with BIO. This course highlights these and other technologies and the disorders that are uncovered, some for the first time.

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Multi-Spectral Imaging (MSI) of the Retina and Choroid

Specially engineered fundus cameras take up to a dozen serial images with the same number of light emitting diodes, each of a different color and each enhancing the visibility of various retinal depths and structures.

- Internal limiting membrane-ERM and posterior hyaloid
- Retinal nerve fiber layer – thinning and thickening
- Retinal vessels - oxy and deoxy states now observable
- Inner retina structures
- Outer retinal structures
- Retinal pigment epithelium- RPE atrophy, hypertrophy and migration
- Choroid – lobule infarction, nevis, melanoma and indeterminate choroidal mass

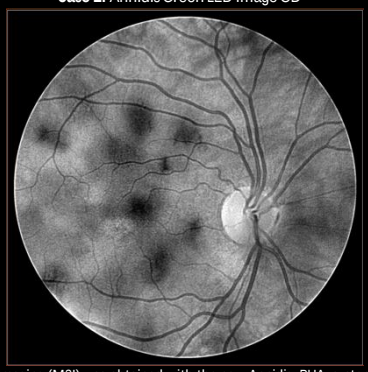
Ultra-wide field color imaging (Panoramic Ophthalmoscopy) and ultra-wide field (UWF) Fluorescein Angiography

- Both yield essentially a 200 degree image in one flash
- "Steering" or changing a patient's fixation in any direction adds an additional 20 degrees or so.
- Both can be accomplished without pupillary dilation in most patients
- Useful for myriad retinal and choroidal disorders.
- UWF FA very useful to detection peripheral vascular disorders such as Coat disease, Sickle Cell Retinopathy etc.

Case 1: Topcon 3D OCT Fundus Image OD

A 25 year old female presented with blurred vision in her right eye. She was concerned about her eyes because she was told by her neurologist that patients with her disorder, neurofibromatosis type 1, sometimes develop visual problems. Previous eye exams failed to reveal any unusual findings. Our patient was first relieved when a -1.00 lens corrected her vision in her right eye to 20/20 and a -0.50 in her left eye also resulted in 20/20. The slit lamp exam revealed several iris spots which were perhaps small Lisch nodules or just commonplace iris freckles.

Case 1: Annidis Green LED Image OD



Multi-Spectral Imaging (MSI) was obtained with the new Annidis RHA system. Although the color composite MSI image was normal, scans in the red and infra-red spectrum were remarkably revealing of numerous deep lesions.

Case 1: Optomap® Ultra-Widefield Auto Fluorescence OD

AF is a novel imaging procedure which yields information about the RPE. Most AF in the fundus is to the aging pigment, lipofuscin. Here the vast majority of the retina reveals a normal AF glow suggesting that the RPE is normal. There is perhaps a subtle bull's eye suggesting some minor RPE involvement in the macula. (Note the shadowing inferiorly due to superior eyelashes.)

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