Descriptive Interpretation of OCT

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Ophthalmic Photographers’ Society
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Describe

- **describe/ˌdi skrīb/**
- Verb: Give an account in words of (someone or something), including all the relevant characteristics, qualities, or events.
- Indicate; denote.
- Synonyms: depict - delineate - portray - picture – represent
  - [wikipedia](https://en.wikipedia.org/wiki/Describe)
Interpret

• **interpretation** • noun \in-ˌtər-prə-ˌtā-shən, -pə-\ (Medical Dictionary)

• Medical Definition of INTERPRETATION
  • the act or result of giving an explanation of something <interpretation of the symptoms of disease>; especially: an explanation in understandable terms to a patient in psychotherapy of the deeper meaning according to psychological theory of the material related and the behavior exhibited by the patient during treatment

• **interpret** transitive verb

• **interpretive or interpretative** adjective

  • Merriam Webster
Interpret

- **Verb**
  - **interpret** *(third-person singular simple present interprets, present participle interpreting, simple past and past participle interpreted)*
  - To explain or tell the meaning of; to expound; to translate orally into intelligible or familiar language or terms; to decipher; to define; -- applied especially to language, but also to dreams, signs, conduct, mysteries, etc.; as, to interpret the Hebrew language to an Englishman; to interpret an Indian speech.
    - wikipedia
Descartian Analysis: *(the physician’s role)*

- The science of the intellect is universal, and there can only be one true method, which consists of **separating what is already simple and clear in order then to attempt to understand that which is complex and obscure**. The method is a collection of reliable, easy rules, observing which there is no risk of mistaking the false for the true. In a logical process, the analyses of each of the possible elements is first performed: Then after this phase, the synthesis of all these elements is performed, and the results of these flow into the conclusions. **To replace the apparent chaos of data with an ordered and rationally constructed system.**
Role of Ophthalmic Imager

• Provide the best quality images
• Facilitate good patient compliance to ease the process and assure repeatability
• Understand (interpret) what is being shown in order to make adjustments to improve the quality of the information
Logical Sequence

• Essential when analyzing (OCT) scan.

• Each element
  – hyperreflective lesions
  – hyporeflective lesions
  – anatomical changes
  – quantitative alterations
  – retinal thickness
  – retinal map

must be analyzed to arrive at an interpretation.
Two Types of Analysis

**Qualitative analysis**
- morphology and anomalous structures
- reflectivity: hyper, hypo and shadowing

**Quantitative analysis**
- thickness
- volume
- area
Normal Scans

- There are “normals” for ocular structures
- Deviation from the norm = abnormality = pathology
- Being able to discern differences in reflectivity, morphology and qualitative measures either from “normals” or from previous scans is the essence of OCT interpretation
Reflectivity of Normal Retinal Tissues

- High reflectivity
  - Nerve Fiber Layer
  - RPE
- Medium
  - Plexiform layers
  - Nuclear layers
- Low
  - Photoreceptors
Reflectivity *Increased (hyper)*

- **Superfical** – ERM, hemorrhage, cotton-wool spots
- **Intraretinal** – hemorrhage, hard exudates
- **Deep** – drusen, SRNV, nevi, RPE hyperplasia
Reflectivity  *Reduced (hypo)*

- intraretinal –
- fluid, cysts
- deep – RPE detachments
- *Shadow areas* – “screened”
- anterior –
  - asteroid bodies, vitreous hemorrhage
Morphological Changes in Structure

- Myopia (concavity)
- Detachments (convexity)
- Vitreo-retinal traction
- Disappearance of the foveal depression
- Surface distortions (folds)
- Separation of tissue (holes)
Morphological changes – Abnormal Structures

• Structural changes
• Vitreous strands
• Preretinal neovascular membranes
• Epiretinal membranes
• Exudates
• Drusen
• Choroidal neovascular membranes
Qualitative

- Boundaries of RPE Detachments
  - Regular
  - Rounded
  - Single or Multiple
  - Irregular
  - Smooth
  - Bump
Qualitative

Anterior
- Hemorrhage
- Exudates
- Retinal blood vessels

Posterior
- Neovascular membrane
- RPE thickening
- Accumulation of pigment
- Choroidal neovascularization
- Retinal scar
Quantitative Interpretation

Quantitative analysis

- Thickness
- Volume
- Area
Quantitative Interpretation

- Thickness
- Volume
- Area
Retinal Thickness

- Increased
- Decreased
- Variations in thickness of a layer
  - (e.g., nerve fibers)
- Retinal map
- Volume
Thickness

- Quantify thickness and volume of retina
- RNFL thickness
- Comparison of numerical data
  - natural course of a disease
  - response to therapy.
Macular Map

Thickness data

Thickness - Topographic and Comparison to normal - Traffic light
Macular Map

• Volume, cube, thickness maps
• Immediate visualization of increased or decreased thickness.
• Follow progression of edema or atrophy more precisely
Retinal Thickening

**Retinal edema**
- Simple edema
- Cystoid macular edema (CME)
- Chronic edema with serous detachment of the retina

**Vitreoretinal traction**
- ERM—diabetic retinopathy or interface syndromes
- Pulling superficial layers of the retina
- Deformations in the profile and secondary edema
Retinal Thinning

- **Atrophic degeneration.**
- 150 or even 100 microns.
- RPE atrophy,
- which are thinner and less reflective,
- owing to loss of pigment.
The hyporeflective RPE
- allows increased penetration of light into the choroid.
The reflectivity is increased because light absorption is reduced at the retina and the RPE.
- **Laser scars, fibrous scars.** Scars consequent to laser treatment, chorioretinitis or trauma indicate atrophy of the retina, with thickening of the pigment epithelium/choriocapillaris complex.
RNFL Thickness

- Thickness Data
- Topographic
- Traffic Light Comparison
RNFL Thickness

- TSNIT
- NITSN
- PMB
- Changes over time
RNFL thinning

Normalized RNFL Thickness


RNFL Thickness

Difference to Selected Reference

[Diagrams and data tables showing RNFL thickness changes over time]
RNFL thinning
RNFL thinning

Classification
Above Normal Limits

Classification
Below Normal Limits

Baseline
Jun/29/2012

Follow-Up #1
Sep/7/2012

Warning: Classification results valid for Caucasian eyes only.
RNFL Thickening

Overview Report
SPECTRALIS® Tracking Laser Tomography

<table>
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<tr>
<th>Diagnosis</th>
<th>Comment</th>
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IR 30° ART + OCT 20° (5.7 mm) ART (38) Q: 30 [45]

Notes:

Date: 10/12/2012

Signature:

Software Version: 5.3.4.3

www.HeidelbergEngineering.com

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RNFL Thickening
“Descriptive Interpretation”

• Using common terms to describe the morphology, reflectivity, thickness, volume and area of tissue being scanned with OCT
• Excellent reference to help you
