

## **THE VALUE OF VISUAL FIELDS**

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**COURSE DESCRIPTION:** This course discusses the importance of various types of visual field assessment, and the accurate interpretation of these fields in differentiating causes of vision loss. A case-based approach discusses organic vs. non-organic vision loss, glaucomatous vs. non-glaucomatous vision loss, and anatomic localization of neurologic vision loss.

### **COURSE OBJECTIVES:**

1. To understand the importance of visual field analysis in determining the etiology of vision loss.
2. To learn a systematic approach to visual field interpretation.
3. To understand the importance of matching the visual field with other aspects of the clinical exam.
4. To gain a better understanding of the anatomic localization of various visual field presentations.
5. To better understand how to differentiate glaucomatous from non-glaucomatous visual field defects.
6. To realize how visual fields can help to differentiate organic from non-organic vision loss.

### **COURSE OUTLINE:**

#### **I. ANATOMIC LOCALIZATION**

##### **a. Anterior Visual Pathway Disease**

##### **i. Matching the NFL bundles to the visual field**

1. Papillomacular bundle = cecocentral defect
2. Arcuate bundles = arcuate defects
  - a. Glaucoma is a disease of the arcuate bundles
  - b. Bjerrum scotoma
  - c. Nasal defects
  - d. Respects horizontal meridian
3. Nasal nerve fibers = temporal defects

##### **b. Chiasmal Disease**

- i. Respects vertical meridian (bitemporal)
- ii. Denser above – lesion from below (more common in chiasmal syndrome)
- iii. Denser above – lesion from above (more common in posterior chiasmal syndrome)
- iv. Variety in chiasmal anatomy
  1. Pre-fixed chiasm

- a. Chiasm more anterior
    - b. Incongruous homonymous hemianopia
    - c. Bitemporal denser below
    - d. Central bitemporal defects
  - 2. Post-fixed chiasm
    - a. Chiasm more posterior
    - b. Unilateral or asymmetric visual field loss
- c. Retrochiasmal Disease
  - i. Respects vertical meridian
  - ii. Homonymous Hemianopic Defects
  - iii. More anterior = less congruous
  - iv. More posterior = more congruous
  - v. Optic Tract Lesion
    - 1. Incongruous
    - 2. Anterior to the lateral geniculate nucleus
    - 3. Can have a RAPD
    - 4. Can have optic disc pallor (band atrophy)
    - 5. Can have dyschromatopsia
  - vi. Optic Radiations
    - 1. No associated RAPD, pallor, dyschromatopsia
  - vii. Occipital lobe lesions
    - 1. No associated RAPD, pallor, dyschromatopsia
    - 2. Congruous
    - 3. Often respect both horizontal and vertical meridians
    - 4. Commonly seen in stroke
    - 5. Inferior VF loss = above calcarine fissure
    - 6. Superior VF loss = below calcarine fissure
    - 7. Can have associated macular sparing (related to dual blood supply)

## **II. QUESTIONS TO ASK WHEN INTERPRETING A VISUAL FIELD**

- a. Does the VF defect respect the horizontal or vertical meridian?
- b. Is the VF defect in one or both eyes?
- c. Is the VF defect in the papillomacular, arcuate or nasal nerve fiber bundle?
- d. If binocular, is the VF defect on the same side or the opposite side?
- e. If on the same side, are the VF defects carbon copies?

## **III. TYPES OF VISUAL FIELD TESTING**

- a. Confrontation Fields
  - i. Facial amsler

- ii. Finger counting
- iii. Red targets
- iv. Mimicking

**b. Goldmann Perimetry**

- i. Good to test respect of vertical
- ii. Good for patients with slow response time
- iii. Used to confirm a questionable field
- iv. Tests full field

**c. Tangent Screen**

**d. Automated Fields**

- i. Humphrey
- ii. Octopus
- iii. Others

**IV. VISUAL FIELD INTERPRETATION**

**a. Matching the VF with other aspects of the clinical examination**

- i. RAPD
  - 1. Difference in mean deviation divided by 10 = log unit of RAPD
- ii. Color vision
- iii. Visual Acuity
  - 1. Central scotoma should match level of VA
- iv. Optic Disc Appearance
  - 1. Neuro retinal rim thickness
  - 2. Neuro retinal rim color

**b. Glaucomatous Visual Field Defects**

- i. Arcuate defects
- ii. Bjerrum scotoma
- iii. Nasal step
- iv. VF defects are NOT greater temporally than nasally
- v. Nerve matches disc
  - 1. Vertical elongation
  - 2. Obliteration of neuro retinal rim
- vi. No associated pallor or dyschromatopsia

**c. Non-Glaucomatous VF Defects**

- i. Often associated pallor and dyschromatopsia
- ii. May not match the optic disc appearance

- iii. May have VF loss greater temporally (chiasmal syndrome)
- iv. Requires work-up to determine etiology of optic neuropathy
  - 1. Lab testing
  - 2. Neuro-imaging

d. Other Neurologic VF Defects

- i. Homonymous Hemianopia

e. Functional Visual Field Defects

- i. Spiral Fields
- ii. Does change in test distance cause expected change in VF?
- iii. Repeat VF test with “special” glasses, drops, or other placebo treatments