

Neuro-ophthalmology, Strabismus & Orbital Surgery

Howard R Krauss, MD, DrKrauss@PacificSpecialists.com

Pacific Eye & Ear

11645 Wilshire Blvd., Suite 600

Los Angeles, Ca. 90025

310-477-5558

www.PacificSpecialists.com

I. Introduction

A. 50% of CNS afferent inputs visually related

B. Ocular motor system involves extensive portions of the brainstem cerebellar connections

C. Visual complaints are a frequent harbinger of CNS pathology

1. Afferent system complaints

- a. Decreased vision
- b. Alterations in vision
- c. Visual field defects
- d. Positive visual phenomena

2. Efferent system complaints

- a. Diplopia
- b. Blurred vision
- c. Oscillopsia

3. Adnexal complaints

- a. Proptosis
- b. Lid position abnormalities
 - i. Ptosis
 - ii. Lid retraction
- c. Sensory changes
 - i. Numbness

D. Cranial injury frequently affects the visual system

1. Worsen pre-existing symptoms
2. Induction of new defects

II. Anatomy of the visual pathways

A. Afferent pathways

1. Ganglion cells
2. Temporal fibers arc around the macula (anatomic separation)
3. 1.2 million ganglion cells propagate the optic nerve
4. Crossing in the chiasm
 - a. Inferior fibers cross anteriorly
 - b. Macular fibers cross posteriorly

III. Taking a history

A. Basics

1. When
2. Change since
 - a. Exacerbate
 - b. Ameliorate
3. Underlying medical problems
 - a. Hypertension
 - b. Diabetes
 - c. Cardiac disease
 - d. Cerebrovascular disease
 - e. Neoplasia
 - f. Inflammatory disease (autoimmune)
4. Previous imaging

B. Vision

1. Unilateral vs bilateral
2. Near vs distance
3. Visual field defect
4. Metamorphopsia
5. Last eye exam

C. Double vision

1. Does it resolve covering either eye
2. Is the separation the same in all directions
3. Entirely horizontal or vertical component
4. Variable?
5. Oscillopsia
6. Tilt

D. Adnexal

1. Ptosis
2. Globe prominence
3. Numbness
4. Redness

IV. Neuro-op Exam

A. Afferent system

1. Snellen acuity
 - a. With correction
 - b. Pinhole
 - c. Refract
2. Near vision
 - a. Age related add
3. Color vision
4. Contrast sensitivity

- 5. Visual fields
 - a. Qualitative vs Quantitative
 - b. Anatomic correlates
 - i. Macular fibers sensitive to toxic, metabolic, hereditary, inflammatory, compressive pathology
 - ii. Disc is located nasal to the fovea (temporal fibers separated)
 - iii. Right brain sees to the left

B. Pupillary system

- 1. Three pupil questions
 - a. Regular
 - b. Size difference
 - c. Reactivity
 - i. Afferent papillary defect
 - ii. Light near dissociation
- 2. Background illumination
- 3. Fixation of accommodation
- 4. Bright stimulus

C. Ocular motor system

- 1. Stability
 - a. Primary
 - b. Eccentric gaze
- 2. VOR
 - a. Gain
 - b. VOR reserve
- 3. Saccades
 - a. Latency
 - b. Accuracy
 - c. Velocity
- 4. Pursuit
- 5. Convergence

D. Diplopia

- 1. Three double vision questions
 - a. Relieved by covering either eye
 - b. Comitant or incomitant (same in all directions)
 - c. Horizontal or with vertical component
- 2. Influence of fusional amplitudes
- 3. Pathophysiologies incomitant deviation
 - a. Primary overaction
 - b. Restriction
 - c. Paresis
- 4. Location
 - a. Orbit
 - b. Cavernous sinus (superior orbital fissure)
 - c. Subarachnoid space
 - d. Intra-axial

5. Quantitative vs qualitative
 - a. Quantitative
 - i. 9-cardinal position measurements
 - ii. Hess screen
 - iii. Binocular single vision fields
 - b. Qualitative
 - i. Maddox rod
 - ii. Red glass

E. Adnexal

1. Palpebral fissures
2. MRD
3. Upper lid range
4. Lid hang-up
5. Lid skin abnormalities
6. Lid position abnormalities
 - a. Ectropion
 - b. Entropion
7. Orbicularis function
8. Proptosis
9. Dystopia
10. Facial sensation
11. Spontaneous facial movement
12. Vascular abnormalities

F. Fundus

1. Disc appearance
 - a. Disc edema
 - b. Optic atrophy
 - c. Disc anomaly
2. Macular appearance
3. Vascular appearance
4. OCT