5.8.1. Diplopia (I)

Localization

- "wiring diagram" approach
  - conceptualize the anatomical pathway of the cranial nerve or nerves that are assumed to be involved
- in general, a lesion involving the cranial nerve nucleus or fascicle will cause neurologic signs other than ophthalmoparesis ★
  - isolated cranial neuropathies secondary to central lesions are the exception and not the rule!
- attempts at neural localization may fail or give false results in the presence of diffuse disease
- not helpful in a clinical syndrome such as Wernicke encephalopathy

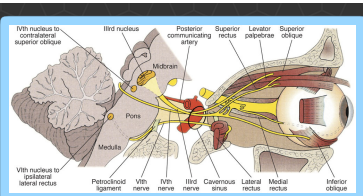

Figure 8-5 (© 2020 American Academy of Ophthalmology)

History

- patient may report
  - double vision
  - "blurred vision"
  - closing either eye eliminates the visual disturbance
- important questions
  - does the double vision resolve when either eye is covered?
    - monocular vs binocular diplopia
  - is the double vision the same in all fields of gaze (comitant), or does it vary with gaze direction (incomitant)?
  - is the double vision horizontal, vertical, oblique, or torsional?
  - to what extent is diplopia constant, intermittent, or variable?
- other questions
  - is double vision more bothersome with far or with near fixation?
  - head/eye pain
  - numbness
  - eye/eyelid swelling or redness
  - other neurologic symptoms

Comitant and Incomitant Deviations

- comitant deviation
  - congenital or early-onset strabismus
  - suppression!
  - no diplopia ✖
  - may experience diplopia later in life if ocular misalignment changes
- incomitant deviation
  - most frequently acquired

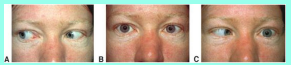

Figure 8-4 (© 2020 American Academy of Ophthalmology)

  - congenital incomitant deviations
    - e.g. overaction of the inferior oblique muscle
    - typically do not produce diplopia ★
  - usually causes diplopia ★
    - if deviation is very small, fusional amplitudes may eliminate the diplopia
    - small misalignments may produce blurred vision rather than obvious diplopia
    - patients with subnormal visual acuity may not recognize diplopia
  - an incomitant deviation may become comitant with time ★
    - "spread of comitance"
    - especially likely with a fourth nerve palsy
      - may occur with either a restrictive or paretic incomitant deviation
    - probably mediated at a cerebellar level
      - gradual recalibration of the innervation to yoke muscles of each eye

Differentiating Paretic From Restrictive Etiologies of Diplopia

- suggestive of restrictive etiology
  - proptosis
  - enophthalmos
  - eye surgery
  - thyroid eye disease ★
  - orbital trauma ★
  - most common causes of restrictive strabismus
- patients may have both neural and restrictive components, especially after trauma
- saccadic speed 🙂
  - restrictive conditions do no
  - paretic conditions reduce the saccadic velocity
- forced duction test 🙂
  - can often be felt by an examiner
  - restrictive process produces a mechanical limitation
  - false-positive result
  - chronic neural lesions may also, rarely, cause mechanical limitation ★


Figure 8-3 (© 2020 American Academy of Ophthalmology)

- measuring intraocular pressure in primary position and in upgaze 🙂
  - increase of ≥5 mm Hg suggests restrictive etiology

Monocular Diplopia

- etiology
  - abnormalities of the refractive media
    - uncorrected astigmatism
    - keratoconus
    - corneal irregularities
    - tear film abnormalities
    - cataract
    - improves with pinhole ★
  - maculopathy with retinal distortion
- binocular diplopia can be relieved by closing either eye
- demonstration of monocular diplopia obviates the need for a neurologic workup 🛑

Physical Examination

- ocular redness/swelling
- proptosis
- consistent head tilt or head turn
  - evidence of chronicity may exist in old photographs
- ductions
  - abnormal ductions can often be recognized by gross observation
- versions
  - 1 alternating cross-cover test
    - 9 standard positions of gaze
      - comitant vs incomitant ❤
        - comitant misalignment
          - congenital strabismus
        - incomitant misalignment
          - acquired disorder
      - compare near and far fixation in primary position and downgaze
  - 2 red Maddox rod

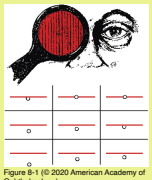
Figure 8-1 (© 2020 American Academy of Ophthalmology)

    - red Maddox rod in front of the right eye
    - left eye views the fixation light
    - patients with phoria may report misalignment of the visual axes ★
      - combine Maddox rod tests with the more objective results of alternate prism cover test
    - sensitive method of obtaining quantitative information about the degree and pattern of ocular misalignment
  - 3 double Maddox rod test

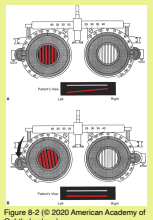
Figure 8-2 (© 2020 American Academy of Ophthalmology)

    - to identify/quantify torsional misalignment when vertical diplopia is present
    - red Maddox rod in front of the right eye
    - white Maddox rod in front of the left
    - both rods are aligned vertically
    - if one of the lines is tilted, 1 Maddox rod is rotated in the appropriate direction to quantify the amount of torsional misalignment
  - 4 qualitative method for detecting relative cyclotropia
    - metal pointer or other horizontal line
    - base-down prism is placed over 1 eye
      - 2 vertically displaced lines are visible
    - fourth nerve palsy is typically associated with convergence of the lines toward the side of the palsy