

Double Vision

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Approach to Double Vision

- History
- Monocular Diplopia
- Physical Examination
- Paretic vs Restrictive Diplopia
- Comitant vs Incomitant Deviations
- Localization

History

- Blurred vision vs double vision?
- Intermittent or constant?
- Closing one eye eliminates the double vision?
- Worse at when looking at distance vs at near?
- Worse in a particular position of gaze?
- Associated... Pain? Swelling? Redness? Numbness? Other neurologic symptoms?
- History of.... Malignancy? Trauma? Thyroid disease? Generalized weakness?

Monocular Diplopia

- Usually due to abnormalities of refractive media
 - Uncorrected astigmatism
 - Corneal irregularities e.g. keratoconus
 - Tear film abnormalities
 - Cataract
- Can also be due to retinal pathology e.g. fluid, hemorrhage, fibrosis
- Ghost images, haloes, more than two images
- Monocular diplopia that resolves with pinhole confirms optical cause

Physical Examination

- External exam: redness, swelling, obvious proptosis?
- Extraocular movements:
 - Each eye individually (ductions)
 - Both eyes together (versions)




Physical Examination

- Ptosis?
- Anisocoria?



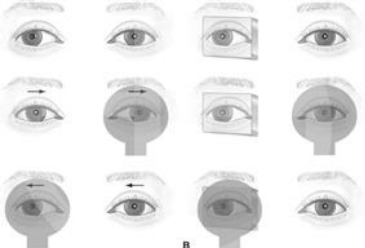
Physical Examination

- Alignment Measurements:
 - Hirschberg



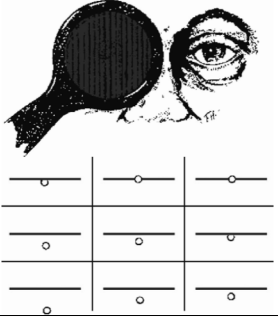
Physical Examination

- Alignment Measurements:
 - Cover testing with use of prism can determine whether misalignment is comitant vs incomitant




Physical Examination

- Alignment Measurements:
 - Maddox Rod testing



Paretic vs Restrictive Diplopia

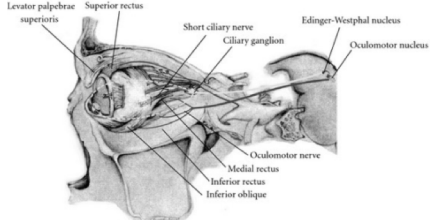
- Common causes of restrictive eye disease
 - Thyroid eye disease
 - Orbital trauma
 - Prior eye surgery
- Reduced saccadic speed in paretic etiologies
- Forced ductions shows limitation in restrictive etiologies



Comitant vs Incomitant Deviations

- Comitant
 - More commonly due to congenital vs early onset strabismus
 - May not experience diplopia due to suppression of one eye
- Incomitant
 - More often acquired
 - Usually causes diplopia

Localization

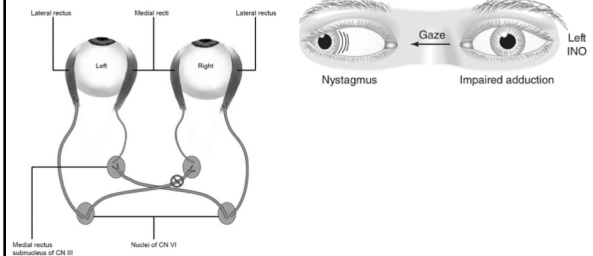


Nuclear causes of diplopia

- CN III nucleus → may affect or spare both upper eyelids and may affect the contralateral superior rectus muscle
- CN VI nucleus → horizontal gaze palsy

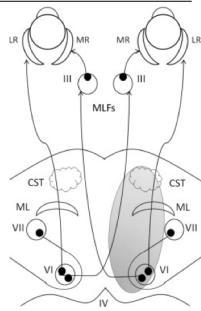
Intranuclear causes of diplopia

- Intranuclear ophthalmoplegia – demyelination, stroke



One and a half syndrome

Horizontal gaze palsy (PPRF or CN VI nucleus) + INO (MLF)



Infranuclear causes of diplopia

- Brainstem – often affects many structures, presenting with other neurologic symptoms
- Subarachnoid segment – often microvascular
- Also consider
 - Myasthenia gravis
 - Giant cell arteritis
 - Neoplasm (compressive or infiltrative)

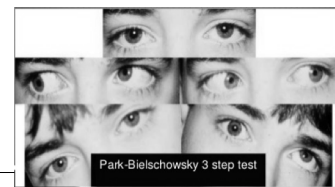
CN III palsy

- Pupil involvement? → must rule out posterior communicating aneurysm
- Complete vs Partial?
 - Complete and pupil sparing → GCA vs microvascular
 - Partial and pupil sparing → must rule out aneurysm



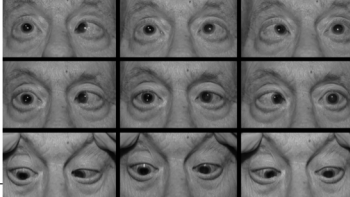
CN IV palsy

- 3 step test
- Congenital – large vertical fusional amplitudes and head tilt
- Acquired – trauma, microvascular, GCA



CN VI palsy

- Older adults – Microvascular
- Younger adults – trauma, high ICP, posteriorly draining C-C fistula
- Infection, inflammatory, neoplastic



More than one CN involved

- Cavernous sinus, superior orbital fissure – CN III, IV, V, VI, sympathetic fibers
 - Tolosa Hunt – idiopathic inflammatory
 - Carotid – Cavernous sinus fistula
- Neuromuscular junction
 - Myasthenia Gravis

Myopathic, Restrictive, Orbital causes of diplopia

- Thyroid eye disease – restrictive strabismus
- Post-traumatic – entrapment, paresis
- Orbital myositis – idiopathic inflammation of the muscles
- Post-surgical – extraocular muscle fibrosis



Other

- Chronic Progressive External Ophthalmoplegia
- Neoplasm
- Brown syndrome – limited upgaze with adduction
- Heavy eye syndrome, Sagging eye syndrome – esotropia and hypotropia in high myopes with staphylomatous globes or older patients

Esodeviations in children

- | | |
|---|--|
| <ul style="list-style-type: none"> • Congenital • Accommodative <ul style="list-style-type: none"> • Refractive • Partially accommodative • High ACA ratio • Non accommodative <ul style="list-style-type: none"> • Basic • Cyclic, q24-48 hours • Sensory • Divergence | <ul style="list-style-type: none"> insufficiency <ul style="list-style-type: none"> • Primary vs Secondary to pontine tumor, increased ICP • Spasm of near reflex • Consecutive • Incomitant <ul style="list-style-type: none"> • CN VI palsy • Medial rectus restriction |
|---|--|

Accommodative Esotropia



Exodeviations in children

- Intermittent exotropia
 - Convergence weakness
 - Infantile exotropia
 - Sensory
 - Consecutive
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