

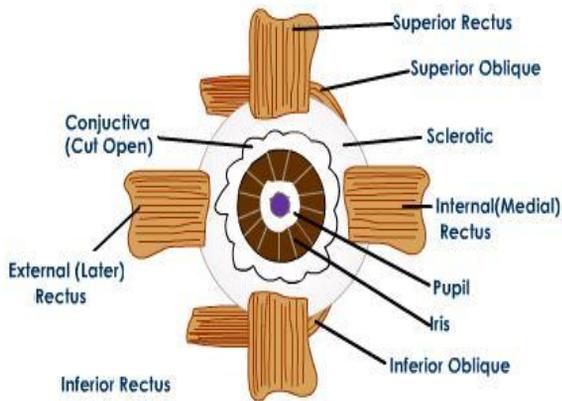
Basic Ocular Motility

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Extra ocular Muscle Actions

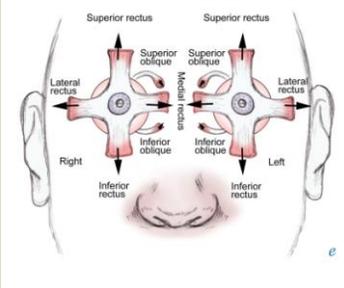
- There are six extra ocular muscles on each eye.
- All muscles except the inferior oblique's functional origin is at the annulus of Zinn.
- The inferior oblique originate at the infero-nasal orbital rim margin, goes back into the orbit, under the globe, and the inferior and lateral rectus then attaches



Extraocular Muscle Insertions

Muscle	Length	Limbus to Plane	Insertion angle
• MR	41mm	5.5mm	0 degrees
• LR	40.5mm	7.0mm	0 degrees
• SR	42mm	7.7mm	23 degrees
• IR	40mm	6.5mm	23 degrees
• SO	59.0mm	13.8mm	54 degrees
• IO	37mm	17mm	51 degrees

Extraocular Muscle Actions



Strabismus

- Tropia-a constant eye turn without any ability to control it with fusion. The patient with a tropia has either constant diplopia or suppression if developed early in life.



Phoria

- Phoria-an eye turn that is in full control and becomes apparent only when fusion is disrupted. Only cross covering the patient will reveal the deviation.



Horizontal deviations

- Esodeviations
- Congenital ET
- Accomodative ET
- 6th CN palsy
- Duane's Syndrome-Type 1
- Consecutive ET
- Cyclic ET
- Divergence paralysis
- Pseudo ET



Horizontal Deviations

- Exodeviations
- Convergence Insufficiency
- Congenital XT
- MR palsy/3rd CN palsy
- Duane's Syndrome-Type 2
- Sensory XT
- Consecutive XT
- Cranial Facial Anomalies
- Convergence Paralysis-Trauma
- Internuclear Ophthamoplegia(INO)-MS
- Pseudo XT



Vertical Deviations

- Hyperdeviations
- Isolated CN palsy-SO palsy most common(4th)
- DVD
- Pseudo HT
- True Hypodeviations
- Brown's syndrome
- Double Elevator Palsy
- Blowout Fracture
- Grave's/TED



Pseudostrabismus

- All babies have uncoordinated eyes until they are 6 months of age.
- The Hirschberg test determines the position of corneal light reflexes on the corneas in relation to one another



Paralytic Strabismus

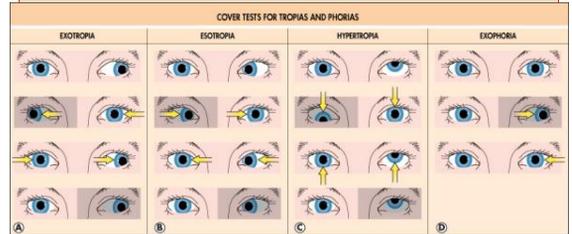
- Strabismus caused by any cranial nerve palsy.
- Most common horizontal-6th vertical 4th
- Characterized by their incomitance
- Will have a primary and secondary deviation
- Primary deviation is amount of strabismus measured with normal eye fixating
- Secondary deviation is amount with paralytic eye fixing. It is always larger than primary eye,so document which eye fixating in measurements
- Because of Hering's Law,when paralytic eye fixing more additional innervation goes to the normal eye. The healthy eye "overacts"

Amblyopic Detection

- Amblyopia is defined as decreased vision in one eye that cannot be attributed to a specific organic problem and cannot be improved with corrective lenses.
- There are over ten causes of amblyopia. Most are treatable before the age of 9.
- Most people believe if it is not treated by the age of 8 or nine, the vision will not recover.

Evaluation Assessment Methods

- Cover/ uncover
- Only done to detect tropias



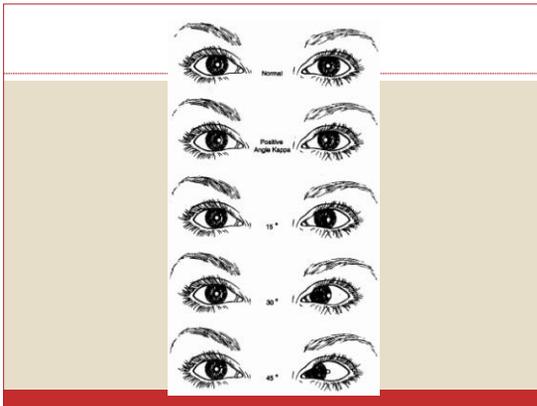
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Cross Cover/Alternate Cover Test

- Test used to measure phorias
- The patient must fixate on an accommodative target (20/40 or smaller) and continue to accommodate on it
- As you cover the eyes, you watch the eye under the cover as it is moved to the other eye
- Do not allow the cover to be removed as binocularity should never take place
- Prism is added to the deviation in the direction to neutralize the movement of each eye as seen on the cross covering

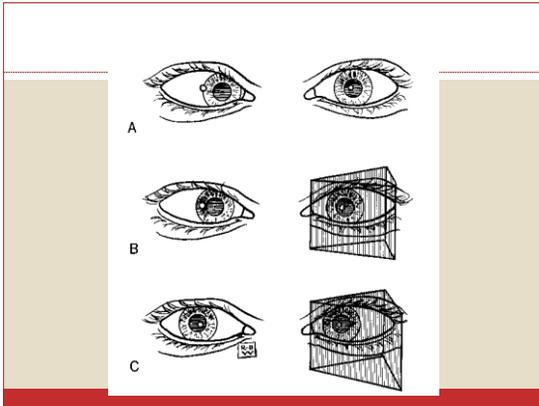
Hirschberg Measurements

- Objective method of measuring tropias on a very young or blind patient
- Hirschberg measures the relative position of the light reflexes in each eye. If the reflexes are symmetrical or slightly nasal in each eye, there is no eye turn
 - If asymmetrical tropia may exist
 - Where the displacement is determines the direction the eye is deviated
- An INward turning eye will have an OUTward displaced light reflex
- 1mm of displacement=7degrees=about 15PD



Krimsky Measurements

- Krimsky measurements use prisms to move the light reflex back to the approximate position of the other eye
- Base out to correct and Esotropia, etc.



Diagnostic Positions of Gaze

- The nine positions to which both eyes are moved as the head remains forward

Stereopsis/Fusion

- There are Three Grades of Fusion
- 1 superimpositioning of dissimilar objects
- 2 motor fusion-fine tuning movements to maintain sensory fusion-amplitude measurements
- 3 stereopsis-blending of two similar images into one, resulting in depth perception

Near Point of Convergence and Accommodative Convergence

- NPC

- Accommodative Convergence-convergence is exerted as the eye accommodates.

- Duction-movement of one eye
- Version-movement of both eyes on one directions
- Vergences-eyes moving in opposite directions to maintain fusion-convergence and divergence

- Abduction: eye moves out
- Adduction: eye moves in
- Dextroversion: both eyes move to the right
- Levoversion: both eyes move to the left
- Convergence: both eyes move in
- Divergence: both eyes move out

Risley Prism

- In the phoropter or hand held
- Prisms mounted front to back and rotated in opposite directions
- Allow gradual increase continuous change in prism



Maddox Rod

- A dissociating test used to detect and measure a phoria or tropia
 - A group of red cylinders lined up side by side
 - When a light is shown through the Maddox rod, it appears as a line perpendicular to the orientation of the cylinders

- Using the Maddox rod
 - To test for a horizontal deviation, have the patient hold the Maddox rod with the cylinders horizontal
 - Shine a pen light or muscle light in a dimly-lit room
 - The eye without the Maddox rod will see a point light
 - The eye with the Maddox rod will see a red vertical line
 - If the red line goes through the white dot of light, there is no deviation

- Maddox rod for horizontal deviations (con't)
 - Place Maddox rod over right eye
 - Patient perceives red line to the right of the white dot, indicates ESO deviation (uncrossed)
 - Patient perceives red line to the left of white dot, indicates EXO deviation (crossed)
 - Place the Maddox rod over the left eye
 - Patient perceives red line to the left of the white dot, indicates ESO deviation (uncrossed)
 - Patient perceives red line to the right of the white dot, indicates EXO deviation (crossed)

- Maddox rod for vertical deviations
 - Have the patient hold the Maddox rod vertical
 - Shine a pen light or muscle light in a dimly-lit room
 - The eye without the Maddox rod will see a point light
 - The eye with the Maddox rod will see a red horizontal line
 - If the red line goes through the white dot of light, there is no deviation

- Maddox rod for vertical deviations (con't)
 - Place Maddox rod over right eye
 - Patient perceives red line below the white dot, indicates right hyper deviation
 - Patient perceives red line above the white dot, indicates right hypo (or left hyper) deviation
 - Place the Maddox rod over the left eye
 - Patient perceives red line below the white dot, indicates left hyper deviation
 - Patient perceives red line above the white dot, indicates left hypo (or right hyper) deviation

