

ophthalmology
Team

#5 –Strabismus, Amblyopia& Leukocoria

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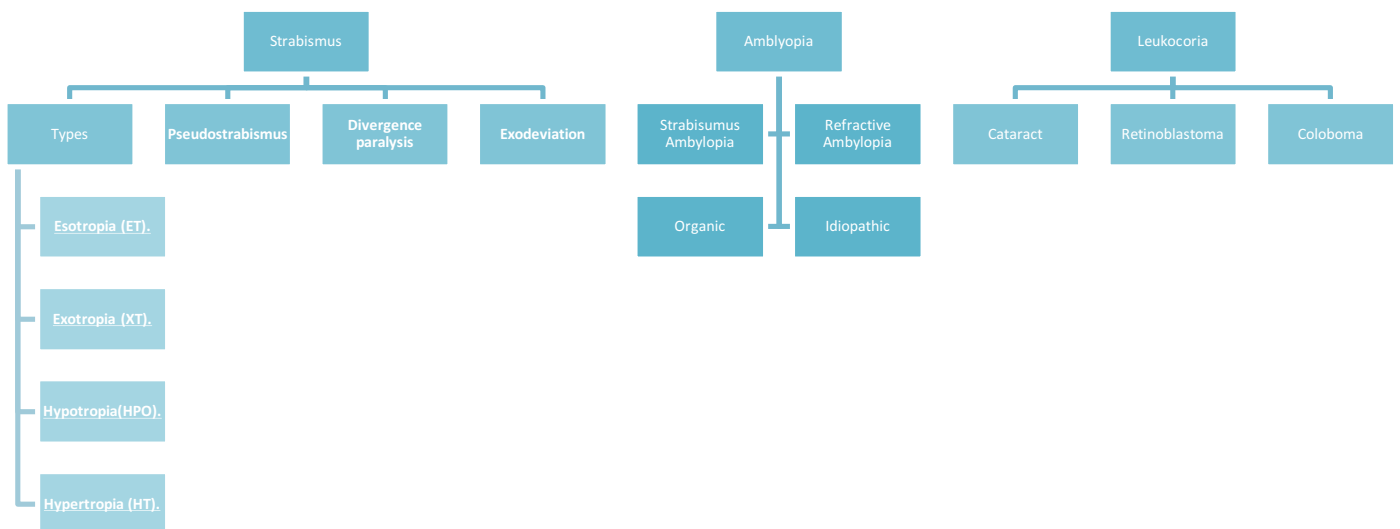
Doctor's note **Team's note** **Not important**
Important **431 teamwork in a yellow box**

Objectives:

Not Provided

Note: This lecture only includes the doctor's words,
for more information, you can check lecture notes page 52.

This link may help <https://www.youtube.com/watch?v=PRa7mPx2XVs>



Strabismus

- Ocular misalignment. **extra ocular muscle imbalance**
- 2%-3% of children and young adults.
- Male=Female
- **Causes:**
 - Inherited pattern. **most patients fall under this category , so make sure you ask about family history always**
 - Idiopathic.
 - Neurological conditions(CP,Hydrocephalus & brain tumors).
 - Down syndrome.
 - A congenital cataract , Eyes Tumor – **risk of amblyopia**
- **Why we are concerned about strab?**
 1. Double vision. mainly in adults . **because children and infants have a suppression feature which is not found in adults**
 2. Cosmetic.
 3. Binocular single vision. =**fusion** , pts should come earlier to save the **vision**
- **Consequences**
 - Lazy eye (amblyopia) .
 - Double vision. You see it in children if they have a tumor and they present with sudden esotropia
- **Tests for deviation imp**
 1. Hirschberg test : 1mm from pupil center=15PD or 7° . **if its at the pupil edge =30 pd , midway between pupil and the limbus its 60 pd and at the end 90 pd. also known as corneal light reflex → you shine the light at one arm length into both eyes and see the corneal reflex it should be in the center . MCQ nasal shift→ exotopia temporal shift esotropia**
 2. Krimsky :place prism on fixating eye until control reflex in deviated eye . **same as 1 but you add prism tool (to measure the exact deviation)**
 3. Cover test . **cover one eye and look for deviation in the eye you examine**
 4. Prism cover test. **same as 3 but with prism**



Hirschberg test upper most picture is in the center we call it orthoptic and its normal . if the light is shifted temporally or laterally . we call it esotropia (inward deviation) at the edge of the limbus. If its nasally shifted we call it exotropia (outward deviation) . the second and third picture both are esotropia



Esotropia

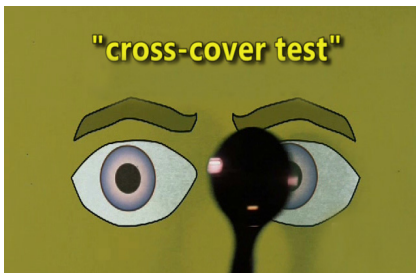


Krimsky test

You place the prism in the fixing eye till you reach the power needed to make the light reflex at the center . in his case the apex is out so this is a case of exotropia



This pt has exotropia because the apex is out and base of the prism is at 40 pd



Also called Alternate Cover test. Move the occluder from one eye to the other eye. If its normal it shouldn't move Cover test :Cover one eye and after you remove it you see the movement under the cover

- Cover uncover = detects TROPIA
- Cross cover = tropia and phorias it's the most accurate

Non-committant

	ET 20	
ET 10	ET 12	ET40
	ET18	
Comittant strabismus		
	ET20	
ET 25	ET30	ET25

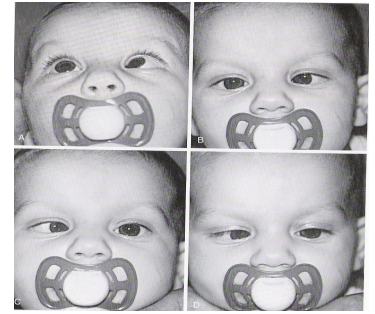
Types of Strabismus

1. Comittant : XT or ET Almost same angle in any direction of gaze . In the picture you see the central then lateral , medial , up , down gaze are all within similar angle approximately 10pd
2. Non-Comittant: XT or ET angle change with direction of gaze(Paretic, restrictive)

角膜反射實驗 (Hirschberg test)

Diagram	Correct numbers
	1mm = 7° = 15PD
	2mm = 15° = 30PD
	3mm = 21° = 45PD
	4mm = 28° = 60PD

- **Types of strabismus:**
- 1. **Esotropia (ET). Also called cross eyed**
- 2. **Exotropia (XT).Also called wall eyed**
- 3. **Hypertropia (HT).**
- 4. **Hypotropia(HPO).**



Esotropia:

1. Infantile (congenital) ET.

- Large Angle.
- Small hypermetropia .
- Before age of 6months .
- Cross fixation (turning the face to fixate the eye contralateral to the target). → pt look at the right target with the left eye and vice versa

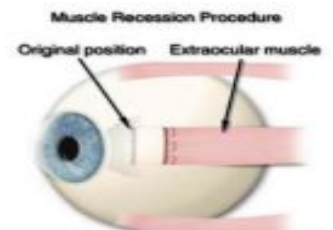
- Infantile esotropia because the light is temporal
- Also there is alternating inward deviation
- Also inferior oblique overaction when he looks up and in the eye dives in

➤ **Ocular association of infantile ET :**

- DVD (dissociate vertical deviation) .
- IOOA .(inferior oblique oval overaction)
- Latent nystagmus.
- Smooth pursuit asymmetry(slow laging temp. on OKN).
- DHD(dissociate horizontal deviation)

➤ Treatment of infantile ET.

- Surgically by **weakening the medial rectus muscles** (by disinserting the muscle from the original position and move it backward according to the degree of deviation i.e. if it was 30 you see in a table how many mm you have to move back to place the insertion in the sclera) at age of 10-11months. Goal is to achieve monofixation syndrome →(fusion or 3D is = to binocular single vision)
- Prognosis: gross stereopsis . (a tool in the clinic assesses 3D . it's a book where they see pictures and the biggest is a butterfly)

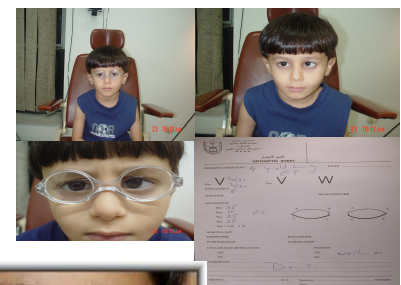


- **Clinical example:**

- A 4-month-old healthy child presents with a history of his eyes turning in most of the time, since about 8 weeks of age.
- Examination: ET for both distance and near 60 PD.Extra Ocular Movement is Full.Cycloplegic retinoscopy is+1.25 D Fundus :normal. **Always measure the near and distant deviation**

2. Accommodative ET: most common

1. hypermetropic(refractive)
2. high AC/A ratio:
 - **The accommodative convergence/accommodation (AC/A) ratio** gives the relationship between the



amount of convergence (in-turning of the eyes) that is generated by a given amount of accommodation (focusing effort).

- -Esotropia with high AC/A ratio (also termed nonrefractive accommodative esotropia).
- Treatment is bifocal glasses non surgical
- The patient with blue shirt → cycloplegic refraction was done → if he needs distance refraction you have to give him suitable glasses and for near as well so give bifocal (which is a thin line separating the glasses, the sheet is called orthoptic sheet showing almost equal vision and the distance deviation 35, near is 35 as well → when you give glasses for distance its 10 which is acceptable, for near large esotropia which is large you need to place +3 bifocal lens over his glasses, and they found the near was corrected up to ten showing a high aca ratio)
- >+2.00 hypermetropia. In the infantile its not seen so no risk of amblyopia
- age >6mo-7years (4yrs).
- High risk of amblyopia.
- Intermittent at onset then constant.
- Corrected totally (<10PD residual N+D) **non surgical with glasses**. the eyes become straight. the picture below cycloplegic refraction assessment was done → showed hypermetropia → then managed with glasses



3. Partially accommodative ET.

- **Aquired non accommodative ET (DIVERGENCE paralysis) → emergency**
- **>10 PD residual**
- Treatment :Surgery Sx for the residual deviation .
- Scenario → pt was given glasses two months later he comes to you with residual 10PD or more for Distance+Near with full hypermetropic correction.--> you need to refract him again to see if there is any hidden hypermetropia → if its not found you go for surgical. Unlike the fully accommodative type mentioned earlier which requires only glasses

Divergence paralysis:

- **ET at Distance > Near .**
- **MRI : arnold chiari, pontine tumor**
- **First treat the underlying cause then treat the esotropia with surgery**

4. Sensory ET.

- ET due to unilateral blindness → pt with such a problem could have it both ways inward and outward deviation
- Treatment: Surgical and usually for cosmetic purposes

5. Cyclic ET.

- Very rare.
- Acquired(2-6yrs).
- Cycle between straight and ET.
- Treatment: if hypermetropia ~glasses .if not hypermetropia ~ Surgery

Pseudostrabismus: MCQ

Pseudoesotropia is a condition in which alignment of the eyes is straight (also known as orthotropic); however, they appear to be crossed.

- Due to :
 - a flat nasal bridge
 - prominent epicanthal folds.
- A careful ocular examination (eg, pupillary light reflex, cover test) reveals that the eyes are straight.

**Exodeviation**

- a horizontal form of strabismus characterized by visual axes that form a divergent angle.

Types:**1. Intermittent exotropia X(T). most imp**

- Acquired.
 - Early childhood.
 - Intermittently **controlled by fusional convergence.**
 - **Close one eye in the bright light.** Parents notice it.this happens due to the outward drifting of the eye which created a double vision
 - **Treatment**
 - Surgical treatment. Which involves lateral rectus muscle
- Indications of surgery



This deviation may later progress to constant exotropia- initially Intermittent exotropia

1. poor control.
2. The deviation occurs more than 50% of time.
3. Lost distance stereopsis . (tool to check the fusion)
 - non surgical: alternate patching .over minus.

2. Congenital XT.

- Very rare.
- Constant large angle → between the two eyes which is assessed by the prism
- Poor fusion prognosis
- High risk of amblyopia
- Associated with craniofacial abnormalities, albinism, Cerebral Palsy.
- Tx: BLR Weakening.



3. Sensory XT.

- Blind in one eye so it drifts outward.
- Surgery.

4. Convergence insufficiency.

- Inability to maintain the convergence on objects approaching from Distance to Near .
- C/O: asthenopia(frontal headache), diplopia .

Types of exotropia X(T)

Basic	Pseudo divergence excess	True divergence excess
<ul style="list-style-type: none"> • XT Distance =Near • Bilateral Lateral Rectus weakening 	<ul style="list-style-type: none"> • Xt D>N • Patch 30-60min • XT D=N • BLR weakening 	<ul style="list-style-type: none"> • XT D>N • Patch 30-60min in the clinic then measure again if its = then its pseudo divergence if persists it co • XT D>N • R&R → resection and recession

- X or XT at Near ,Stright at Distance.
- Remote near point of convergence (normal 5-6cm).
- Tx: orthoptic exercise. Pencil push up or prism base out

- Amblyopia refers to reduced vision, uncorrectable with glasses or contact lenses, due to failure or incomplete development of the visual cortex of the brain. **Eye itself is normal but brain cant translate the image**
- **VA is <20/40 or worse or 2 lines below the good eye .**
- 2 ~4%.
- Almost during visual immaturity till the 9th BirthDay.
- Unilateral or bilateral.
- **Classification:**

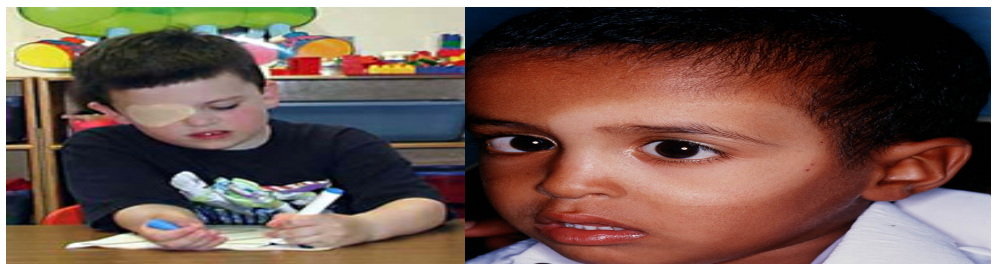
Strabismus Amblyopia

Refractive Amblyopia

Occlusive :organic ,cataract

Idiopathic ,2ry to nystagmus

- **Criteria of Dx:**
 - VA<20/40 OU or in one eye.
 - FHx.
 - Hx of visual deprivation during infancy .like cataract
- **Treatment**
 - Optical correction.
 - PTO → **patching as a treatment option , you patch the healthy eye and let the pt exercise with the diseased one not sleep**
 - Defocusing (penalization). Dilate with atropine to create a deep focusing state where the pt is not seeing through the healthy eye . this should be used for a short period as atropine has a lot of ADR.
 - **MCQ if the patient refused patching what the next modality? Defocusing (penalization)**



Patching

Leukocoria MCQ

Definition = white pupil and no red reflex

- **Cataract.**
- **Retinoblastoma** → eye tumor, highly aggressive and need immediate intervention. treatment is enucleation (remove the eye). picture of the dark skinned girl
 - It arises from the photoreceptors
 - It's the most common tumor to primary ocular in children
 - Less than 4 year average 18 months
 - Due to random somatic mutation or several germline inheritance pattern
 - Spreads by extension to the optic nerve toward the brain
- **PHPV** → persistent hyperplastic primary vitreous
- **COLOBOMA**
- **RD** → retinal detachment
- **Astrocytoma**
- **Coat's disease, uveitis.**



Good Videos:

<https://www.youtube.com/watch?v=dRYBOBSyzAU>

<https://www.youtube.com/watch?v=TxEQWtIXtrl>

<https://www.youtube.com/watch?v=PRa7mPx2XVs>

MCQs:

Q1: A pre mature baby was born in 20 week of gestation and weight 1200 gm. Which eye condition will he have?

- A. Coat's disease
- B. Macular degeneration
- C. Retinal detachment
- D. Neovascularization of optic head

Answer : C?

Q2: A 12 year-old brought by his father to the clinic with gradual decreased vision in both eyes. His uncorrected vision is 50/20 and improved with pinhole to 20/20. What is the most likely diagnosis?

- A. Congenital cataract
- B. Congenital glaucoma
- C. Myopia
- D. Amblyopia

Answer: C

Q3: 3 months old child presented with this lesion:

A. What is the diagnosis ?



Capillary hemangioma of right eye

B. What serious complication of this lesion ?

Amblyopia

If you have any questions/suggestions
regarding Ophthalmology teamwork please via:

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