Strabismus, Amblyopia & Leukocoria

OBJECTIVES:

- Not given.

There is some difference between f1&f2 slides so make sure to cover all the different points under each topic

DONE BY: Bayan Al-Mugheerah, Ghada AlHadlaq.
REVISED BY: Deena AlNouwaiser, Shrooq Alsomali
REFERENCES: lecture, 436 (A) team work, lecture notes book.
Editing file

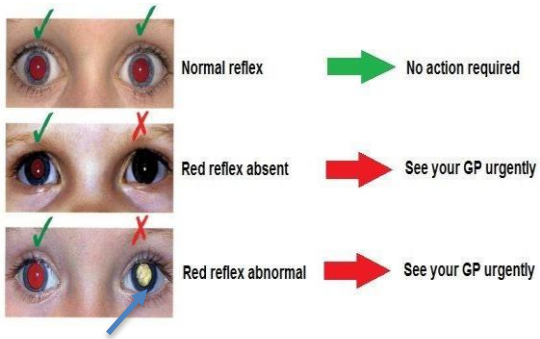
Color index: Important | Notes | Book | Extra

Special thanks to 436 (A) teamwork.

- All topics are important, because they carry a significant effect on the vision.
- Children are still growing, and their vision is still not mature so if anything happens, the growth of vision stops which means it will not develop to a full potential visual acuity.

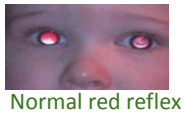
Leukocoria

(There is some difference between f1&f2 slides so click here to check the different points)



The pathology here can be anywhere: cornea, anterior chamber, lens, vitreous or retina.

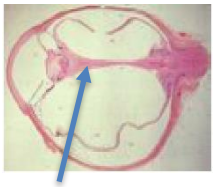
- Definition: white opacity of the pupil.
  - The color of the normal red reflex comes from the retinal pigment epithelium.
  - How to diagnose the leukocoria? **direct** ophthalmoscope, shine light at pupils from 1 meter (you must get an equal red reflex).
  - **Definitive diagnosis:** B scan ultrasound.



Normal red reflex

- Causes:
  - **Cataract** (opacity of the lens).
    - It is **the most common cause of leukocoria** in children.
    - It can be congenital or acquired, usually causes blurred vision and glare.
      - The most common causes of acquired cataract are TORCH & trauma.
      - The diagnosis of congenital cataract is made by a direct ophthalmoscope.
    - In children max 1 month to do surgery
      - Treatment of congenital cataract must be performed within the first few weeks of life and be accompanied by a coordinated patching routine to the fellow eye to stimulate visual maturation in the amblyopic eye and minimize the risk of squint.

  - **Persistent hyperplastic primary vitreous (PHPV)** (also called persistent vascular fetus disorder)
    - It is a congenital condition caused by a failure of the normal regression of the primary vitreous.
    - It is usually associated with **unilateral vision loss.**
    - It is caused by an embryological defect during growth of embryo.
    - During embryological development, there is a blood vessel coming from the optic nerve to supply the lens. It should disappear before birth, but if it persists, we call it PHPV.
    - It causes of opacity of the lens & the growth of the eye will stop (the eye will look smaller).



This should disappear before birth

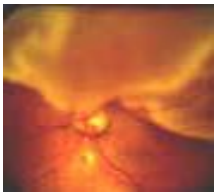
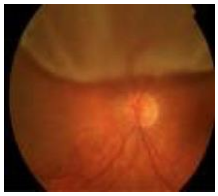
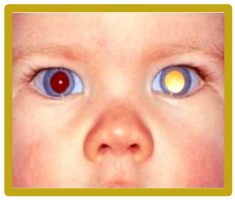
Opacity of the lens

  - **Organized vitreous hemorrhage.**
    - A vitreous hemorrhage is usually secondary to a neovascular membrane or a retinal tear.
    - If a child got trauma, there will be blood in the vitreous, and if the blood gets organized, this will prevent you from seeing transparent vitreous.
    - The most common cause of vitreous hemorrhage in babies is birth trauma.
    - Patients may complain of:
      - A red haze.
      - Blurred vision.
      - Floaters.
    - As it starts to resolve, color changes to yellow then white and some fibrous sheets may persist.

- **A B-scan is usually diagnostic**, and vitrectomy is usually required.

♦ Retinal detachment:

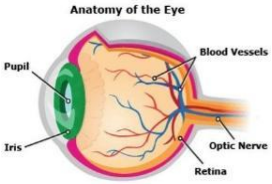
- Risk factors include:
  - Trauma (mainly) and surgery.
  - Vitreous detachment.
  - High myopia.
  - Retinal breaks or tears.
  - Retinal vascular disease.
  - History of detachment in the other eye.
- Symptoms include:
  - Flashes of light.
  - Floaters.
  - Curtain-like decrease in vision.
- Retinal detachment is basically a separation of the neurosensory retina from the retinal pigment epithelium, so when this happens there will be no color behind the neurosensory retina resulting in a white appearance of the detached retina (curtain-like); But, you have to have a big retinal detachment to see leukocoria when you shine the light.

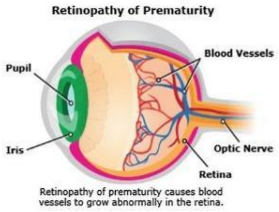




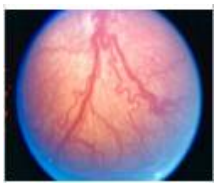
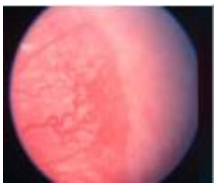
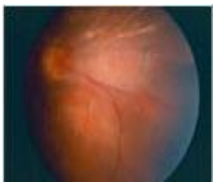
Abnormality: leukocoria
2 causes: cataract & retinoblastoma

♦ Retinopathy of prematurity (ROP):

- It occurs in premature, low-birth-weight infants maintained on oxygen therapy.
- Signs include:
  - **Neovascularization.**
  - Fibrous bands.
  - Retinal detachments.
  - Vitreous hemorrhage.
- When advanced leukocoria can be present.
- During the embryology life, blood vessels will come from optic nerve and spread to the periphery of the retina to supply it.; This process doesn't stop before 37 weeks GA.





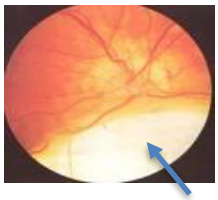




Retinal fibrosis pulling to the side as a complication of ROP

- If **a child decides to come early (premature),** the blood vessels have no time to reach the periphery, so he will be born with part of his retina not supplied by blood vessels> ischemia > neovascularization (to supply the ischemic parts, but they are fragile) > bleed > fibrosis > fibrosis shrinks > pull **the retina causing RD.**
- If a child is not caught at an early stage, he will end up with a blind state because there will be **total retinal detachment**!!
- If you go to a blind school, you will find a good number of children with ROP.
- **Any child born less than 1500g or 28 weeks must be screened in the NICU** before going home to provide early intervention if needed (the screening is usually 4-6 weeks after birth).
  - According to the book (any child born before 32 weeks of gestation should be screened for ROP).
- The less the weight, the earlier the birth, the sicker the baby > the more likely to get ROP.
- Rx: laser to kill (burn) the ischemic retina (stop the demand), but it will destroy the peripheral vision (tunnel vision); however, central vision is preserved (20/20).

- **Coloboma** (occurs in uterus):
  - A **congenital condition** caused by incomplete closure of the fetal fissure.
  - Degree of visual loss related to area affected (iris, retina, choroid, or optic nerve head).
  - Does coloboma causes problems? It depends if the macula and fovea are involved this will result in poor vision if it happens away from the macula and fovea the effect will be less.

will result in "keyhole" or "cat eye" appearance.

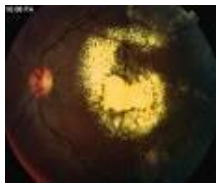


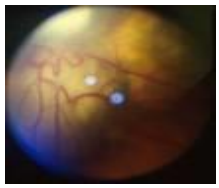
Leukocoria from **scleral shining** because of absence of retina.

- **Medullated nerve fibers** (occurs in uterus):
  - **Congenital anomaly** caused by myelination of the retinal nerve fibers and usually asymptomatic unless the macula is involved.
    - Involvement of the macula will cause decrease in vision because 95% of our visual acuity comes from the fovea.
  - When large areas are involved, it can cause leukocoria.
  - Normally, we have **non-myelinated axons** going to ON.
  - We have myelination in our bodies for insulation, if there's myelin in the retina it will cover the macula and disrupt the vision.

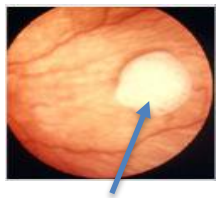
In the retina, the nerve fibers are non-myelinated to allow the passage of light "Cat fur appearance".

- **Coat's disease** (congenital condition):
  - Typically, a unilateral condition found in young boys.
  - It is characterized by retinal telangiectasia and aneurysms that may cause exudative retinal detachment.
  - Their blood vessels leak exudates (lipids).
  - It won't affect the vision unless involving the macula.
  - The diagnosis is not by examining the retina only we inject the fluorescein stain.
  - Rx: cauterization of leaking vessels by laser (like DM).





- **Retinoblastoma (RB):**
  - The most important cause of leukocoria because it doesn't affect the vision only, but it can be a life-threatening condition.
  - Most common primary, **malignant, intraocular tumor** of childhood but still a rare tumor.
  - Vast majority become apparent **before age of 3 yrs** (2-4 y).
  - It results from **malignant transformation of primitive retinal cells** before final differentiation.
  - **Presentation is** most commonly (60%) with **leukocoria** and strabismus.
    - **If you see leukocoria, always think of RB until proven otherwise.**
  - It is a lethal condition because it can extend to optic nerve & reach the brain.
  - Rx: radiation, enucleation (removal of the eye as well as ON) or chemotherapy (the earlier the better).
  - Think about the life of the patient, vision is not a priority in RB.
  - We monitor the patient for 20 years, and we screen other children in the family.

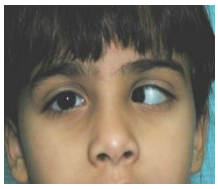


Tumor (retinoblastoma)

AMBLYOPIA (lazy eye)

(There is some difference between f1&f2 slides so click here to check the different points)

- Definition: **reduction in visual acuity in one or both eyes**; this reduction cannot be completely accounted for by any clinically apparent organic abnormality.
- Always occurring before the age of 7 years.
- Prevalence of 2% to 4% in the general population.
- It is the single most common form of monocular vision impairment in the first 4 decades of life.
- Remember the eye is growing & will not get mature immediately after birth.
- The development of the visual acuity takes time (when a child is born the vision is around 20/200 and it improves over years).
- Amblyopia means that you have one functioning eye, you can't be a pilot, a surgeon or an ophthalmologist. The only way to prevent it is by early detection.
- Classification:
  - According to the condition that induced it (cause of amblyopia).
  - Strabismus is the most common amblyopia-inducing condition.
  - 40% of children with a manifest strabismus develop amblyopia.
  - Esodeviations are more common than exodeviations.
  - Strabismus **will never resolve** by itself with growing, and it will develop to amblyopia.



The child is having strabismus (esotropia) & the left eye is the weak one; because the clarity of the image sent from the left eye is bad (the eye is already rotated & image isn't falling on fovea). While the image sent from the right eye is falling on the fovea & will be sharply clear. When the brain receives 2 images of different clarity, it will choose the clear one & neglect the other; resulting in amblyopia of the neglected eye.

- **Anisometropic Amblyopia:**
  - **Anisometropia**
    - 1.50 D of hypermetropia.
    - 1.50 D of astigmatism.
    - 3.00 D of myopia.

    - It means both eyes are not sending clear images because of different refractive errors in each eye.
    - One eye will send clear image and the other is blurry, the brain will receive 2 different images. The brain will prefer the clear image and tell the other eye not to send images > amblyopia.

    - **The only way to find out anisometropia is to screen the child**, at 6 months, 2 years, 4 years, 5 years (4 times).
      - **The child will never complain of anything** and the family would not notice anything because both eyes look normal.

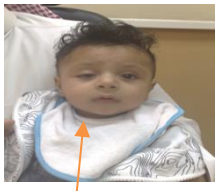
- **Cataracts, corneal opacities, eyelid ptosis, eyelid hemangioma:**
  - Result in more severe visual impairment than strabismic or refractive amblyopia.
  - Why is the cornea a good medium for bacteria? Because it is an avascular structure, so no WBCs coming, and the infection will become severe.
  - Amblyopia can't be prevented in trauma patients, but it can be reversed when it occurs.

Diagnosis: unilateral congenital ptosis
Complication: amblyopia
Treatment should be started ASAP

Cataract secondary to trauma

Hemangioma causing drop of the eyelid

Infection secondary to trauma



Congenital ptosis

♦ Screening for Amblyopia
  - Half of all amblyopia cases undetected until age 5 years.
  - All newborn infants should be screened in the nursery with the use of a red reflex test to check for media opacities.
  - Infants should be evaluated for fixation preference, ocular alignment, and eye disease by 6 months of age.

Occlusion amblyopia from excessive patching

Diagnosis: capillary hemangioma of right eye
Complication: amblyopia

Bilateral congenital cataract

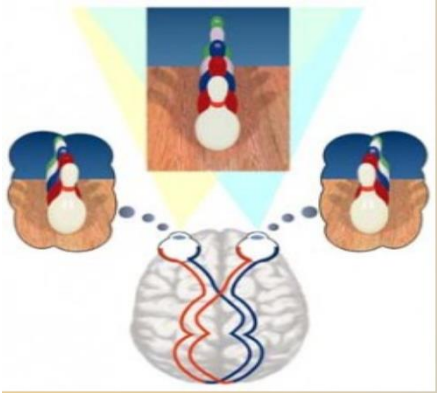
♦ Management
  - **The first thing to do is to treat the underlying cause** (is it ,for example, anisometropia, cataract or strabismus).
  - **Occlusion (2nd thing)**
    - **The "gold standard" treatment for unilateral amblyopia is occlusion of the dominant eye** to force fixation to the amblyopic eye.
    - Opaque adhesive patch applied to the skin.
    - Opaque contact lenses, cloth occluders applied over the glasses, and graded transparent filters.
  - **Amblyopia can be treated only during the first 5 years of life because of brain plasticity in children.**
    - **It is too late to treat amblyopia at the school age.**

Reason for patching the eye? To treat amblyopia in the left eye.
Causes of this condition: cataract & strabismus.
If the child refused to patch, what is the alternative? atropine drops.

Strabismus

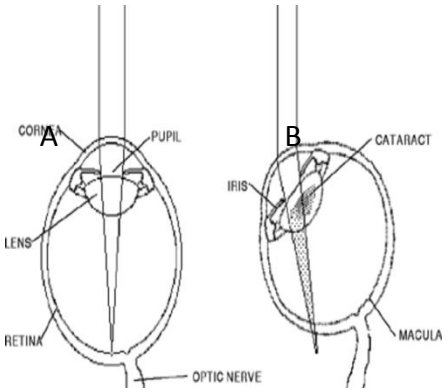
(There is some difference between f1&f2 slides so click here to check the different points)

- Strabismus is a general term referring to ocular misalignment due to extraocular muscle imbalance (eyes are not aligned together).
- Strabismus occurs in approximately 3% of children and young adults.
- Strabismus has an inherited pattern, i.e., it is much more likely to occur if one or both parents are affected.
- However, many cases occur without any family history of the disorder.
- Why we are concerned about strabismus?
  - It is important for functional and cosmetic reasons.
  - Strabismus is associated with reduction of depth perception and, if onset is in adulthood, double vision.
  - Strabismus presents a cosmetic concern, especially for school-age children.
- When an individual's eyes are straight, they are said to have orthotropia. This indicates that both eyes are aimed at the same spot. The brain fuses the two separate images into one three-dimensional image.



  - As we said before, when we use both eyes, we get 2 images; both images are shared by both eyes.
  - Our retina is also divided into nasal and temporal parts; The temporal part will go to the same side of the brain, and the nasal will go to the opposite side. Then both images will go to the occipital cortex and get mixed there into a single image.

- If the eyes are misaligned, depth perception is substantially reduced. when one eye is deviated in early childhood, the brain may learn to ignore the image from that eye, and amblyopia (lazy eye).
- **In adulthood, the affected individual usually experiences double vision.** This occurs because the brain, which no longer has the "plasticity".



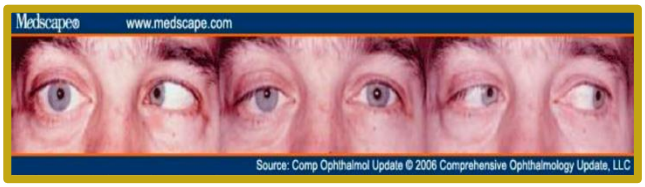
A. The eye is straight & the image is falling on the fovea.
B. The eye is having inward deviation & the image is falling away from the fovea; therefore, the image will not be clear & the eye will be amblyopic.

- Types of Strabismus:
  - Comitant → means the deviation doesn't change wherever the patient look, and it's more common than non-comitant in children).
  - Non-comitant → means there is deviation in certain gazes and is usually related to mechanical restriction or neurological condition such as 6th nerve palsy.

The child looks normal in this picture

The faulty eye is the left eye because the lateral rectus is not working (no abduction) causing non-comitant strabismus.

- She has squint and ptosis in **the right eye.**
- In picture 2, she is looking to the left side, but medial rectus of the right eye isn't working.
- In picture 3, she is looking up, but the right eye doesn't look up.
- But when she looks to the right in picture 3, she seems normal; thus, it is **non-comitant**.
- She has 3rd nerve palsy in the right eye **(the 3rd nerve supplies all muscles except lateral rectus and superior oblique).**
- This is neurological, she might've had stroke (this doesn't occur in children).



Lesion: right 6th nerve palsy.
Cause: intra-cranial tumor.

Nerve injured: left oculomotor nerve.
2 most imp systemic causes: HTN & DM.

This is a case of brown syndrome (mechanical problem in the superior oblique)

- Cause of strabismus? (in children)
  - Unknown. However, strabismus is certainly more common in families with a history of the disorder.
  - The **great majority of children** who present with strabismus have no other associated neurological abnormalities.
  - Several neurological conditions are more commonly associated with strabismus, including Down's syndrome, cerebral palsy, hydrocephalus, and brain tumors.
  - A cataract, eye tumor, or other eye disorder associated with reduced vision may also present with strabismus.

- Types of **comitant strabismus:**

- Esotropia: most common, more than exotropia why? Because pediatric normally have hyperopia and with stress, fever , trauma and other risk factors the eye decompensated خلاص ماتتحمل اكثر من كذا فيصير لها ديفييشن يقولولك الاهل كان طبيعي الولد فجاه لفت عينه على جوا
- Exotropia.

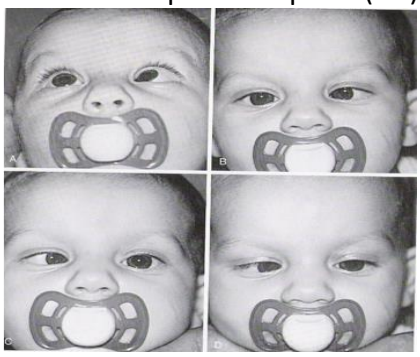
Esotropia is divided into:

- Infantile esotropia (develops during the first 6 months of life, not born with it. If born with it, we call it congenital).
- Acquired esotropia.

Infantile esotropia:

Infantile esotropia (comitant)

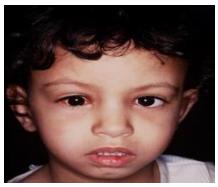
- Infantile esotropia is the inward deviation of the eyes noted before the patient reaches **age 6 months**.
- When the eyes are misaligned in childhood, binocular vision, or the ability of the brain to use the two eyes together, does not develop.
- Infantile esotropia is not believed to be connatal but rather develops in the first few weeks or months after birth.
- Classic infantile esotropia is constant and involves a large angle of deviation exceeding 20 prism diopters (PD) on corneal light reflex measurement.



Alternating esotropia
So this child will not have amblyopia

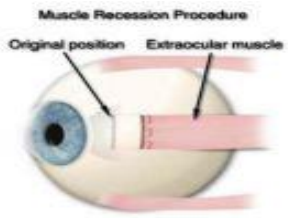
Left eye will become amblyopic.

Infantile esotropia (Right eye will become amblyopic).



First day post-op

- **Management of infantile esotropia:**
  - For infantile esotropia, we do surgery to stretch the muscle (medial rectus is pulling the eye toward the nose) & patch the normal eye to treat amblyopia + Follow up the child until 8-9 years for the amblyopia not the squint.
  - ALWAYS Surgery for the extra-ocular muscles.
  - Treat the amblyopia by occluding the good eye.



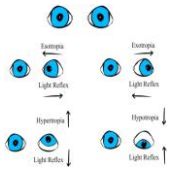
Muscle recession procedure

- Prognosis after surgery for Inf ET?
  - Better ocular alignment and visual prognosis can be achieved if surgical correction is performed before age 2 years.
  - Long-term follow-up studies on esotropic infants by age 2 years have shown that close to 60% achieve a small angle (10PD) cosmetically acceptable strabismus.
  - Although some binocular vision is achieved, it generally is subnormal, often involving peripheral fusion.
  - Factors contributing to poor ocular alignment and visual prognosis include persistent preoperative amblyopia, latent manifest nystagmus, and myopia from -2.5 to 5.0 D.

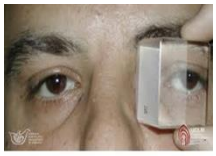
- **CASE:** could come in the exam (MCQ)
  - **A 4-month-old healthy child presents with a history of his eyes turning in most of the time, since about 8 weeks of age. How to approach this child:**
    - **History taking:** family history, born at which week of gestation, mode of deliver
    - **Examination:**
      Check the visual acuity, how to check the visual acuity in infant? fix and follow(following an object), CSM test "Central (no deviation) Steady (no nystagmus) Maintained (if u remove the cover can he maintained his eye in the center)".
      Check the extraocular movement: to rule out paralytic 6th nerve palsy, how to check? spinning ندور راسه اذا طبيعي عينه بتناظر على برى باتجاه دوران الراس.
      Check the amount of deviation: Hirschberg test, Krimsky test.
      Check the refraction: cycloplegia is achieved by dilated drop called cyclopentolate (0.5% if child age less than 1, 1% if ≥ 1yo).
      Check for the associations that we just mentioned above: cross fixation, DVD, IOOA, and latent nystagmus.
      Fundus exam to check the optic nerve and retina.

- **Tests for deviation (how to test strabismus):**

  - **Hirschberg test (Corneal light reflex)** please know how to do it very well because you will have it in the OSCE.
    - A test used to assess alignment of the eyes by shining a light in the person's eyes "1 meter away" and observing where the light reflects off the corneas. Every millimeter the corneal light reflex is off center, equals approximately 15 diopters of prism or 7 degrees مهمه هالنقطه احفظوها.

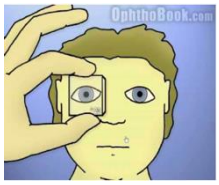


    - **Note: roughly if corneal reflex is:**
      - At the pupil edge = 30 PD (15^{O})
      - Midway between pupil and limbus = 60 PD (30^{O})
      - At the limbus = 90 PD (45^{O})



Krimsky test

    - **When the corneal reflex is:**
      - In the center, we call it orthoptic and that's the normal case.
      - Light is shifted temporally or laterally → esotropia (inward deviation).
      - Light shifted nasally →exotropia (outward deviation).



Name of the instrument: prism. What is it used for: testing the deviation (strabismus).

  - **Krimsky test**
    - The Krimsky test is essentially the same as Hirschberg test, except that we quantitate it better by using a prism. The prism is placed in front of the deviating eye and is used to move the light (corneal) reflex to the center of the pupil. The apex of the prism is directed towards the direction of deviation i.e. laterally if exotropic and medially if esotropic.

  - **Cover test** (most important test) Watch this video and you'll understand everything!
    - There are 2 types of cover tests:

- **Unilateral** cover test (cover-uncover test): performed by having the patient focus on an object then covering the fixating eye and observing the movement of the other eye. If the eye was exotropic, covering the fixating eye will cause an inwards movement; and esotropic if covering the fixating eye will cause an outwards movement. It is used to detect tropias.
- **Alternating** cover test (cross-cover test): performed by moving the occluder from one eye to the other eye. Normally, the covered eye shouldn't move when the occluder is removed. It is the most accurate way to pick up subtle phorias and tropias since it breaks binocular vision.

♦ **IMPORTANT (Always comes in exams).**
- Cover-uncover test → detect tropias.
- Cross-cover test → detect phorias **and** tropias.

• Pseudostrabismus

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

♦ This condition most commonly occurs in infants when a flat nasal bridge and prominent epicanthal folds tend to obscure the nasal portion of the sclera.

♦ A careful ocular examination (eg, pupillary light reflex) reveals that the eyes are straight.

♦ Using the cover-uncover test \Hirschberg, the examiner finds that the patient manifests no deviation it differentiates it from true esotropia (normal exam).

♦ When to operate?

The child looks like he has a squint, but he doesn't because he has flat nasal bridge and the epicanthus fold covers the sclera creating the illusion of eyes going in. we test it by cover-uncover test to see if the eye moves or not.

- Hirschberg \ cover test differentiate it from true esotropia
  - Gradually disappear with age full examination & reassure familyيكبر ويتعدل
  - Prognosis:It is accepted that better ocular alignment and visual prognosis can be achieved if surgical correction is performed before age 2 years.

• Accommodation

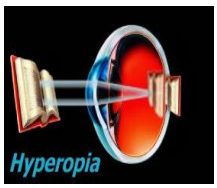
♦ Rays of light from the object diverge, these light rays are then converged by the crystalline lens in an attempt to focus them on the retina. For this to happen, the lens will accommodate, (become thicker centrally and optically more powerful) causing further bending of the rays of light until they focus on the retina.

♦ Relationship of hyperopia to Acc Esotropia

♦ **Near reflex**: accommodation, convergence and miosis (involuntary).

♦ How does accommodation occur at the level of ciliary body? contraction of ciliary body, relaxation of the zonules and the lens becomes thicker providing more power (the main reason to accommodate is to get extra power of the lens).

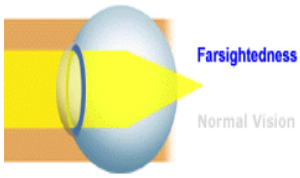
- In children, if they have hyperopia (image behind the retina), they need to accommodate excessively to increase the lens power in order to make things clear, so the convergence will be more leading to esotropia due to muscle stretching (accommodative esotropia).



- **Accommodation esotropia:** = high hyperopia
  - This condition usually presents in patients aged 2-3 years.
  - Perform cycloplegic refraction on all children by using the retinoscope and loose lenses.
  - Cycloplegia is achieved with Mydriacyl 1% and cyclogel 1%.
  - Clinical features of Acc ET:
    - Refractive error usually +3_+4.
    - May precipitated by acute illness or trauma.
    - Start intermittent and if not treated become constant.
  - Do we do surgery for Acc ET?
    - If the farsighted glasses control the crossing of the eyes, eye muscle surgery is never recommended!
  - Treatment of high AC/A?
    - Treatment here is Full cycloplegic correction
    - With patients aged 4-5 years, one can attempt to reduce the strength of the hyperopic correction to enhance fusional divergence and to maximize visual acuity (convex lens to relax the accommodation > back to normal).

Types of squint: accommodative esotropia
Type of refractive error: Hyperopia

* اكثر من زياره يعني يجي المريض نعطيه Full cycloplegic يجي بعد شهر شهرين متحسن ٨٠٪
نعطيه cycloplegic مره ثانيه بعدين الزياره الثالثه بعد ست شهور صارت العين ستريت
* مهم يجي بالساك صوره عين ستريت وعين ديفيتد وجنبها صوره وهو لابس نظارات ترجع العين طبيعي ويسأل ايش هذا؟



  - When to stop glasses?
    - Some children will no longer need their glasses at an earlier age while others will need the proper farsighted glasses or contact lenses to control the esotropia even as adults (50% at 6-7 years of age they get rid of glasses).
    - Not every child with hyperopia will develop accommodative esotropia.

* Wearing glasses for pediatric is MANDATORY, why? To prevent amblyopia
* Adult = optional
* اذا الطفل شال النظاره نورمالي بترجع ديفيتد بس يرجع يحط النظاره تتصحح وعاد اذا كبر يسوي refractive surgery

Diagnosis: esotropia of the right eye.
What happened after wearing the glasses? The esotropic eye is corrected & back to normal
What to do if the left eye becomes amblyopic? Cover the right eye to force the left & improve its vision

Exodeviation

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

- **Exotropia** (less risk of amblyopia)
  - Esodeviations are more frequent than exodeviations, with a ratio of 3:1.
  - Acquired exotropia is more common in the Middle East, Africa, and Asia and in those latitudes with higher levels of sunlight. It is less common in the United States and Europe.
  - The deviation usually begins as an exophoria.
  - This deviation may later progress to intermittent exotropia.
  - When intermittent exotropia develops in a child whose visual system is still immature, bitemporal suppression develops, and the child does not perceive 2 separate images (diplopia).
  - As suppression increases, intermittent exotropia may finally progress to constant exotropia.
  - Intermittent exotropia can have an early onset, with 25-40% of cases occurring before the second year of life.

Diagnosis: strabismus (exotropia).
Examination: corneal light reflex shows outward deviation.
Treatment: if indicated lateral rectus muscle recession.

This deviation may later progress to constant exotropia

- **Subjective methods:**
  - In home control:
    - Parents assess the deviation; The assessment of deviation is categorized as follows:
      - Excellent control, where deviation occurs rarely or only at distance when tired, fatigued, or inattentive.
      - Good control, where deviation occurs less than 5 times a day and only at distance.
      - Fair control, where deviation occurs more than 5 times a day and only at distance.
      - Poor control, where deviation occurs frequently at distance and near.
    - Children characteristically close one eye in bright light. This action may precede the actual divergence of the eyes, or the parents may notice this phenomenon, which becomes the presenting complaint.
  - Classification systems
    - Duane classification
      - If the deviation is greater at distance than at near, it is called the divergence excess type of exotropia.
      - If the deviation is greater at near than at distance, it is called the convergence insufficiency type of exotropia.
      - If little (<10 prism diopters [PD]) or no difference exists between distance and near deviation, it is called the basic type of exotropia
  - In office control:
    - Good control, where the patient breaks down only after cover testing and resumes fixation without a blink.
    - Fair control, where the patient breaks down after cover testing and blinks to re-fixate.
    - Poor control, where the patient breaks down without any form of fusion disturbing

- **For your level you must know these things:**
  - Amblyopia is very important to detect and treat.
  - We have two types of squints:
    A. Comitant (children).
    B. Non-comitant (adults due to neurological causes).

- Also, know that in children we care more about esodeviation more than exodeviation because of amblyopia.
- **Esodeviation types:**
  A. Infantile → first 6 months of life, treated by surgery.
  B. Accommodative: treat by convex glasses.
- If you see a child with squint know if it's real or pseudo.
- **Can we know the anisometropia in children? Yes, by screening.**

Questions:

1. **The mother of one- -and- -a- -half- -year- -old child gives history of a white reflex from one eye for the past 1 month. On CT scan in the orbit there is calcification seen within the globe. What is the most likely diagnosis?**

   A. Congenital cataract.
   B. Retinoblastoma.
   C. Persistent hyperplastic primary vitreous.
   D. Coat's disease.

2. **A child with accommodative esotropia, after complete correction of the the esotropia with glasses. The left eye had decreased visual acuity compared to the right. What is your next management?**

   A. Patch the eye.
   B. Increase the lenses.
   C. Correct the amblyopia.
   D. Refractive surgery

3. **You were asked to examine a preterm newborn in the NICU. Fundus examination revealed engorged blood vessels at the retina. Which of the following should you rule out?**

   A. Hyperplastic primary vitreous.
   B. Congenital cataract.
   C. Retinoblastoma of prematurity.
   D. Retinoblastoma.

4. **A premature infant with a gestational age of 20 weeks and birth weight of 1200 gram. The mother noticed white pupil what is most likely diagnosis?**

   A. Retinoblastoma.
   B. Coats disease.
   C. ROP.
   D. Coloboma.

5. **A 65 years-old patient w/ uncontrolled DM, recently diagnosed w/ HTN came to ER complaining of double vision. On examination, the doctor noted esotropia in her right eye. What is the name of affected nerve?**

   A. Trigeminal.
   B. Oculomotor.
   C. Abducent.
   D. Optic.

6. **A 9- -year- -old girl presented with outward deviation of the eye, with normal funduscopic examination. Which of the following tests in the most appropriate to confirm the diagnosis?**

   A. Corneal light reflection test.

B. Cover uncover test.
C. Visual acuity.
D. Extraocular muscle motility.

7. A 12- -year- -old child came for pre- school routine examination. His best corrected visual acuity in the right eye is 20/20, and in the left eye 20/100. Ocular examination showed normal anterior and posterior segments. Which of the following best describes the patient's situation?

A. Astigmatism.
B. Myopia.
C. Hyperopia.
D. Amblyopia.

8. A premature infant with a gestational age of 20 weeks and a birth weight of 1200 gram. On retina screening examination. What eye problem is he more likely to develop?

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

9. A 2 months old child came with his parents to the clinic complaining of Congenital cataract, what is the proper time to do cataract surgery?

A. At age of 2 years to insert the IOL.
B. At age of 1 year to avoid the General anesthesia complication.
C. As soon as possible.
D. At any age until 6 years.

10. 25-A child came to the clinic upon light reflex the light was shifted temporally in the right eye and central in the left eye. What is the diagnosis?

A. Esotropia.
B. Exotropia.
C. Ephotropia.

Answers: 1: B 2: C 3: C 4: C 5: C 6: B 7:D 8: D 9: C 10: A

Good luck!