**Squint**

**Basic Knowledge**

**Eye Movement**

**Ductions:** Monocular eye movement

- Adduction (inward movement)
- Abduction (outward movement)
- Tortional duction; intorsion (inward rotation)
  extorsion (outward rotation)

**Versions:** Binocular, conjugate eye movement in the same direction

- Dextroversion; both eyes move toward right
- Laevoversion; both eyes move toward left

**Vergences:** Binocular, disconjugate eye movement in opposite directions

- Convergence; eyes move inward
- Divergence; eyes move outward

Eye movement is achieved with 6 extraocular muscles that move the eye in any direction.
Normally both eyes move in a simultaneous and precise action.

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Binocular Single vision (BSV)

Is the ability to use images from both eyes simultaneously and this feature provide a better Visual Acuity, wider visual field and depth perception (stereopsis). Prerequisite for this kind of visual performance include:

1. Clear images from both eyes
2. Images of similar sizes from both eyes
3. Accurate and coordinated neuromuscular development so both eyes (visual axises) directed to the same object of interest
4. Normally developed visual cortex.

Amblyopia

Is a unilateral or bilateral decrease in the best corrected visual acuity caused by vision deprivation and/or abnormal binocular interaction, for which there is no pathology of the eye or visual pathway. There are several types of amblyopia:

1. Strabismic amblyopia: result from abnormal binocular interaction due to continued suppression of the deviated eye.
2. Anisometropic amblyopia: caused by difference in the refractive error between the two eyes.
3. Stimulus deprivation result from vision deprivation e.g. congenital cataract and severe ptosis.
4. Bilateral Ametropic amblyopia due to high symmetric refractive error usually hyperopia.

Amblyopia is treated basically by:

1. Identifying the cause and correcting this cause wherever possible
2. Occlusion of the normal eye to stimulate the amblyopic eye.
Accommodation

increase in the refractive power of the eye on looking to a near object so that its image is clearly focused on the retina.

Accommodation is part of the near reflex, which is initiated by looking to a near object and includes

1. Accommodation
2. Convergence (inward movement of the eyes)
3. Miosis (constriction of the pupil)

Normally one dioptre of accommodation is associated with 4 prism dioptres of convergence

\[ AC/A = 4/1 \]

Classification of strabismus

A. Incomitent (Paralytic): Under action of one or more of the extraocular muscles due to a nerve palsy or muscular disease. The angle of deviation is different with the direction of gaze.
B. Concomitant (Non Paralytic): movement of both eyes are full and The angle of deviation is constant unrelated to the direction of gaze.

Esotropia

1. Accomodative
   a. Refractive
   b. Non Refractive
   c. Mixed

2. Non Accomodative
   a. Essential infantile
   b. sensory
   c. Basic
   d. Convergence excess
Exotropia

1. Constant exotropia
2. Intermittent exotropia
3. Sensory exotropia
4. Consecutive exotropia

Accommodative esotropia

The relation between accommodation and convergence is attributed to this kind of esotropia. It usually manifests between 6 months and 7 years of age.

In **Refractive esotropia**, there is increased hypermetropia, usually between (+2 and +7). This will provoke an excess convergence to see closer objects.

**Non Refractive** esotropia happens due to abnormally high AC/A ratio.

**Mixed** esotropia: both excess hyperopia and high AC/A ratio play a role.

Treatment:

1. Refractive esotropia: convex lenses
2. Non Refractive esotropia: Miotic drugs e.g. Pilocarpin which decrease the AC/A ratio
3. Amblyopia treated by occlusion of the better seeing eye to stimulate the poor seeing one
4. Squint surgery.

Non Accommodative Esotropia

**Essential infantile esotropia** manifest in the first 6 months of age and characterized by large and fixed angle. Treatment is surgical.

**Sensory esotropia** result from unilateral reduction of visual acuity e.g. cataract, retinoblastoma, and macular scarring.
Exotropia

**Constant exotropia** often present at birth and treatment is surgical

**Intermittent exotropia** often present at around age of 2 years with exophoria which break down to exotropia under conditions of inattention, bright light, fatigue and illness.

Treatment include spectacle correction of refractive errors (particularly myopia) if present. Amblyopia therapy by occlusion of the better eye. Surgery is needed in some cases.

Incomitant (Paralytic) Strabismus

This type of strabismus is the result of underaction of extraocular muscle(s) due to nerve paresis or muscle disease.

**Oculomotor (third) nerve Palsy:**

**Causes:**

1. idiopathic
2. Vascular disease e.g. Hypertention and diabetes mellitus.
3. Aneurysm of the posterior communicating artery is very important cause of isolated painful third nerve palsy *with pupil involvement.*
4. Trauma direct or secondary to subdural haematoma with uncal herniation.
5. Miscellaneous e.g. tumors, Giant cell arteritis.

**Diagnosis:**

Ptosis

Exotropia

Limited elevation

Limited depression
Dilated pupil (if parasympathetic fibers are involved)

Trochlear Nerve Palsy

- Characterized by Hyperdivation of the eye inward position
- Impairment of depression in inward position

Abducent nerve palsy:

Characterized by esodeviation in primary position with inability to abduct the affected eye.