SQUINT
(Strabismus)
Anatomical Axis

Line passing from posterior pole through the centre of the cornea.
Visual Axis (Line of vision)

- Line passing from the fovea, through the nodal point of the eye to the point of fixation (Object of regard)

- Because fovea is usually slightly temporal to the anatomical centre of the posterior pole of the eye, the visual axis does not usually correspond to the anatomical axis of the eye.
Angle Kappa

This is the angle subtended by the visual and anatomical axes and is usually about 5 degree. The angle is positive when fovea is temporal to the centre of posterior pole.

A large angle Kappa may give the appearance of a squint when none is present (Pseudo-squint)
SQUINT (Strabismus)

- The visual axis is the line joining the object of attention or point of fixation to the fovea.
- Normally the two visual axes intersect at the point of fixation.
- If the visual axes do not intersect at the point of fixation, strabismus exists.
Squint is a misalignment of the two eyes so that both the eyes are not looking in the same direction.

This misalignment may be constant, being present throughout the day, or it may appear sometimes and the rest of the time the eyes may be straight.
When the eyes are not aligned properly, each of the eyes is focusing on a different object and sends signal to the brain. These two different images reaching the brain lead to confusion and may have either of the two effects:

1. Diplopia
2. Suppression
### Suppression

A child would ignore the image coming from the deviated eye, and thus sees only one image. But in the process, he loses the depth perception. This suppression of the image from the deviating eye results in poor development of vision in this eye, which is known as **amblyopia**.

### Diplopia

An adult cannot ignore the image from either eye, and therefore has double vision. This can be very annoying and may interfere with work. (No suppression)
Heterotropia (Manifest Squint)

Manifest deviation leads to Either,

- Double vision
- Suppression of image in the deviating eye (Amblyopia)
1. By the direction of the squinting (turning) eye:

- An eye that turns inwards is called an **esotropia**.
- An eye that turns outwards is called an **exotropia**.
- An eye that turns upwards is called a **hypertropia**.
- An eye that turns downwards is called a **hypotropia**.
Classification

2. Whether the squint is present all the time (constant), or comes and goes (intermittent).
Classification

3. Whether the affected eye turns when the eyes are open and being used (manifest squint) TROPIA or whether the eye turns only when it is covered or shut (latent squint) PHORIA but looks fine when the eyes are open.
Heterophoria- (Phoria)

Latent Squint

- Tendency of the eyes to deviate when fusion is blocked (Latent squint)
- Slight phoria is present in most normal individuals and is overcome by the fusion reflexes
- It may be inward imbalance (Esophoria) or an outward imbalance (Exophoria)
- When fusion is insufficient to control the imbalance the phoria is described as decompensating and is often associated with symptoms of binocular discomfort or double vision (Diplopia)
Orthophoria

Implies perfect ocular alignment in the absence of any stimulus for fusion.

(This is uncommon)
## Classification

### 4. Whether the severity (angle) of the squint is the same in all directions or not:

<table>
<thead>
<tr>
<th>Concomitant</th>
<th>Incomitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The angle (degree) of the squint is always the same in every direction that you look. That is, the two eyes move well, all the muscles are working, but the two eyes are always out of alignment by the same amount no matter which way you look.</td>
<td>• The angle of squint can vary. For example, when you look to the left, there may be no squint and the eyes are aligned. But when you look to the right, one eye may not move as far and the eyes are then not aligned.</td>
</tr>
<tr>
<td>• (Non Paralytic)</td>
<td>• (Paralytic)</td>
</tr>
</tbody>
</table>
Classification

5. By age of onset.

Most squints develop sometime in the first three years of life.

Some develop in older children and adults.

Squints that develop in children usually have different causes to squints that develop in adults.
Classification

6. By the cause:

- In many cases of childhood squint the reason why a squint develops is not known. (Central)
- In some cases of childhood squint (and most cases of adult squint) the squint occurs because of a disorder of the eye, eye muscles, or nerves
SQUINT- Causes

Childhood,

- Failure of normal development of binocular fusion mechanisms
- Oculomotor imbalance secondary to differences in refraction of the two eyes
SQUINT- Causes

Adulthood,

- Failure of fusion secondary to poor vision in one eye
- Weakness of Extra ocular muscles
- Mechanical restriction of Extra ocular muscles
- Damage to nerve supply of Extra ocular muscles
## Diagnosis

<table>
<thead>
<tr>
<th>First Step</th>
<th>Second Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. History</td>
<td>1. Fusion</td>
</tr>
<tr>
<td>2. Refraction</td>
<td>2. Fixation</td>
</tr>
<tr>
<td>3. Vision (BCV)</td>
<td>3. Deviation (Tropia &amp; Phoria)</td>
</tr>
<tr>
<td></td>
<td>4. Measurement of deviation</td>
</tr>
<tr>
<td></td>
<td>5. Amblyopia</td>
</tr>
<tr>
<td></td>
<td>6. EOM</td>
</tr>
</tbody>
</table>
Diagnosis

- Hirschberg Test
- Krimsky’s Test
- Cover Test
- Cover- Uncover Test
- Alternate cover Test
- Cover Test with Prisms
- EOM
Hirschberg Test
The patient has a very large angle esotropia which appears to be greater than 90 prism diopters (PD). The patient's vision is 6/60 OD, 6/6 OS. The left eye is clearly preferred and the patient does not alternate fixation.
Krimsky Method

In this photograph, a 45 PD prism was placed over EACH eye and this almost centered the light reflex but not completely. The patient has a greater than 90 PD esotropia.
Cover – Uncover test
Orthophoria, normal
No complaints, asymptomatic
Cover – Uncover test
Esophoria, abnormal, common
Only seen when eye is covered
Often asymptomatic, no complaints
Note OS does not move.
Cover – Uncover test
Exophoria, abnormal, common
Only seen when eye is covered
Note OS does not move
Often asymptomatic, no complaints.
Cover test

Left Exotropia, Constant

May be visible with or without alternate cover

Right eye preference
Cover test

Left Exotropia, Constant

May be visible with or without alternate cover

Right eye preference

Note: no eye movement, so be sure to check both sides
Alternate Cover test
Exotropia, intermittent
May be visible with or without alternate cover
May have intermittent diplopia, especially when tired or sick
Mom sees misalignment every now and then.
Alternate Cover test
Exotropia, Constant
May be visible with or without alternate cover
May or may not have constant diplopia

G.Vicente, MD
Normal Convergence
Convergence Insufficiency
Alternate Cover test with Prism

Exotropia, Constant

Use prism to quantitate the deviation.

Change prism power until movement is neutralized.

Use this number to plan surgery

G.Vicente, MD
This is a classic presentation of an accommodative esotropia: onset around 18 months of age, large angle esotropia between 20-40 prism diopters, hyperopia. (Although the patient is looking slightly off to the right, the left eye is clearly esotropic)
Accommodative Esotropia, Corrected

The patient in her full cycloplegic refraction. The esotropia is completely corrected. There is no evidence of a high AC/A ratio. Her corneal reflexes are clearly symmetrical.
A large angle deviation is typical of infantile esotropia. As is commonly seen in this condition, there is over action of the inferior oblique in the adducted right eye causing a vertical deviation.
Patient is referred for esotropia. The light reflexes are symmetrically centered in both pupils. Eye movements are full. The position of the inner canthus and lids give the impression of esotropia.
Divergent Concomitant Strabismus, Alternating Exotropia

Patient has greater than 45 Prism Diopters of Exotropia. The patient is 20/20 OU and does alternate fixation. However, the patient has strong preference for right eye fixation, as seen in this photograph.
Divergent Concomitant Strabismus, Alternating Exotropia

The patient has a large angle exotropia that is greater than 45 prism diopters (PD). In this photo, the Krimsky method is employed to measure the exotropia. The light reflex is almost centered with 45PD (Base inside)
Infantile Exotropia
The large angle exo-deviation is typical of this condition.
Intermittent exotropia
Intermittent exotropia, is the most common form of exotropia. It is a phoria controlled by fusional mechanisms that breaks down into a manifest tropia when the fusion is interrupted. This interruption may be caused by fatigue, illness, or inattention. Patients typically have excellent vision and stereopsis. Intermittent exotropia generally does not require surgery unless there is an increase in frequency or duration of the deviation. Bilateral lateral rectus recessions are the most common surgical procedure used to correct.
Sixth Nerve Palsy, Unilateral
Third Nerve Palsy
Management

- Correction of refractive Errors
- Management of Amblyopia
- Management of any other ocular disease
- Squint Surgery
Squint Surgery

1. Rcessions (Lengthening)
2. Resections (Shortening)
Large ET (65PD), bilateral MR recession, and LLR resection
Management

➢ Correction of refractive Errors
➢ Management of Amblyopia
➢ Management of any other ocular disease
➢ Squint Surgery
Squint Surgery

1. Rcessions (Lengthening)
2. Resections (Shortening)
Large ET (65PD), bilateral MR recession, and LLR resection
GET READY

- Open your note book
- Take your pen
- Write answers of MCQs in your note book one by one
- One minute for each question
- Each MCQ carry one mark
In VI nerve palsy the eye is deviated:

a) Laterally
b) Medially
c) Not deviated
d) Superiorly
e) Inferiorly
Commonest symptom of 6th cranial nerve palsy is:

- Headache
- Impaired visual fields
- Diplopia
- Vertigo
- Dilated pupil
A 60 years old lady is complaining of sudden onset of Diplopia.
On examination she has left eye deviated inward while right eye is straight.
What will you call this type of squint:
1. Alternating squint
2. Concomitant squint
3. Incomitant squint
4. Microtropia
A 60 years old lady is complaining of sudden onset of Diplopia. On examination she has left eye deviated inward while right eye is straight. What will you call her condition:

a) Right Exotropia
b) Left Esotropia
c) Right Esotropia
d) Left Exotropia
A 60 years old lady is complaining of sudden onset of Diplopia. On examination she has left eye deviated inward while right eye is straight. Her ocular movement examination shows that left eye does not move outwards while rest of the ocular movements is full. Which muscle function is defective:

a) Left Inferior Rectus
b) Left Lateral Rectus
c) Left Medial Rectus
d) Left Superior Rectus
A 60 years old lady is complaining of sudden onset of Diplopia. On examination she has left eye deviated inward while right eye is straight. Her ocular movement examination shows that left eye does not move outwards while rest of the ocular movements is full. Which nerve is involved:

a) Left Abducent nerve
b) Left Trochlear nerve
c) Left oculomotor nerve
d) Right Trochlear nerve
A 60 years old Diabetic and Hypertensive man is complaining of sudden onset of drooping of Right eyelid. On examination he has right ptosis and restricted ocular movements in almost all direction except outwards. What is the type of ptosis:

a) Congenital
b) Mechanical
c) Paralytic
d) Senile
A 60 years old Diabetic and Hypertensive man is complaining of sudden onset of drooping of Right eyelid. On examination he has right ptosis and restricted ocular movements in almost all direction except outwards. Which nerve is affected:

a) Left Abducent nerve  
b) Right Abducent nerve  
c) Right Oculomotor nerve  
d) Right Trochlear nerve
A 60 years old lady is complaining of sudden onset of Diplopia. On examination she has left eye deviated inward while right eye is straight. In the Hirschberg test, where would you expect the torch light on the eye:

a) At the pupil
b) To the left of left pupil
c) To the right of left pupil
d) To the left of right pupil
In case of Left Exotropia, If you cover the right eye, what do you expect in the left eye.

a) right eye moves out
b) right eye moves in
c) left eye moves in
d) No movements happen
NOW
Mark your paper