CLINICAL EVALUATION OF STRABISMUS

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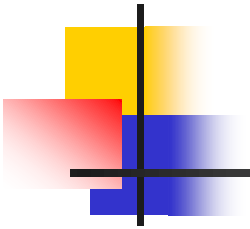
HISTORY

- Age of onset
- Variability
- General health
- Birth history
- Family history

Examination

- Visual acuity testing
- Tests for stereopsis
- Tests for sensory anomalies
- Measurement of deviation
- Motility tests
- Refraction and fundoscopy



- Testing VA in preverbal children
- Testing VA in verbal children

Testing VA in preverbal children

Simple examination and observation of the child

Occlusion of one eye

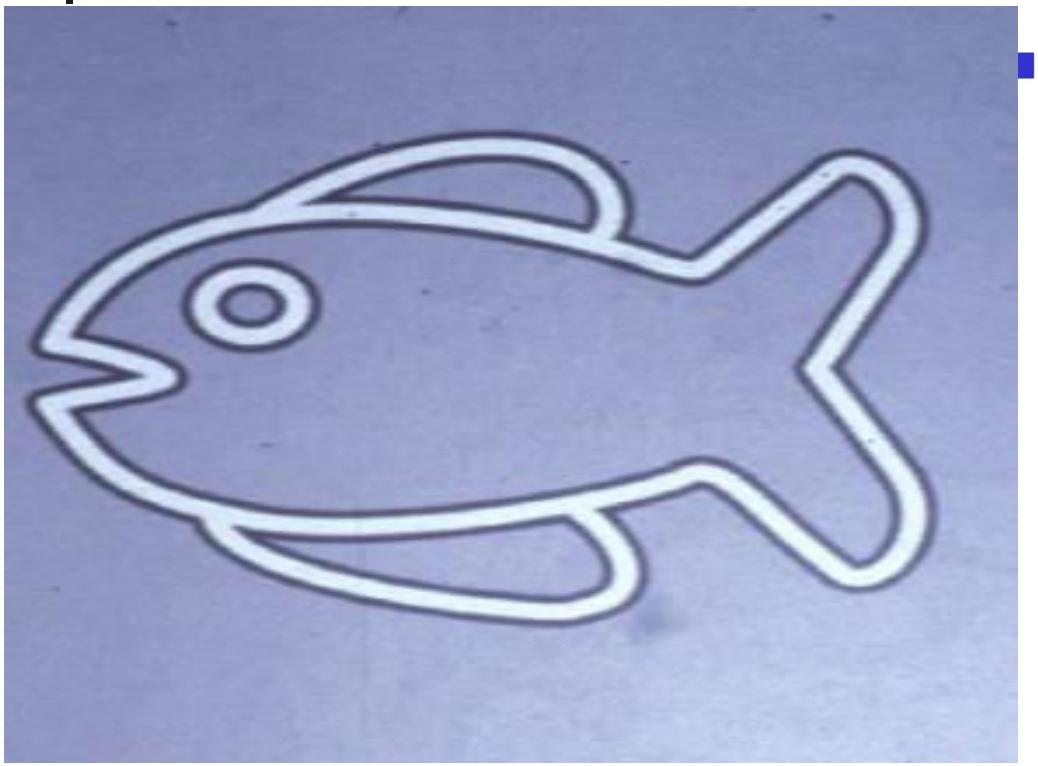
Hundreds and thousands test

If a child is able to see and pick up small sweets at 33cm VA is at least 6/24

Rotation test

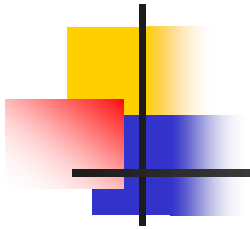
- Gross qualitative test of the ability to fixate with both eyes open
- Examiner hold the kid facing him and rotates briskly through 360^0
- If VA is normal eyes will deviate in the direction of rotation under the influence of vestibul-ocular response
- The eyes will flick back to normal position to produce nystagmus
- When rotation stops nystagmus also stops due to suppression of post-rotatory nystagmus by fixation
- If viion is poor the post rotatory nystagmus does not stop as vestibulo-ocular response is not blocked by visual feed back

Preferential looking



- They are based on the fact that infants prefer to look at a pattern rather than homogenous stimulus

  (cardiff acuity cards)



- Remember fixation should be

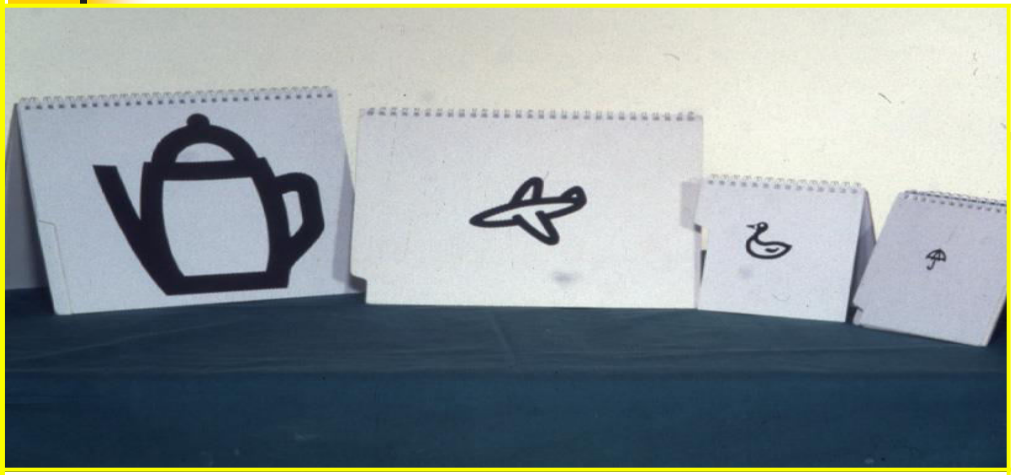
C entral

S teady

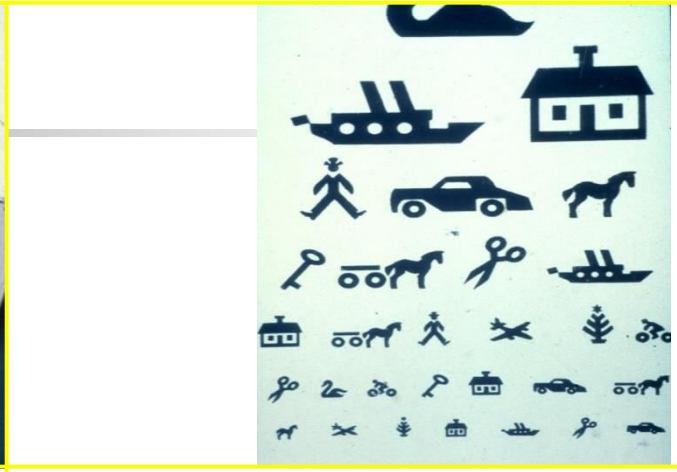
M aintained

VA testing in verbal children

At age 2 years (naming pictures)



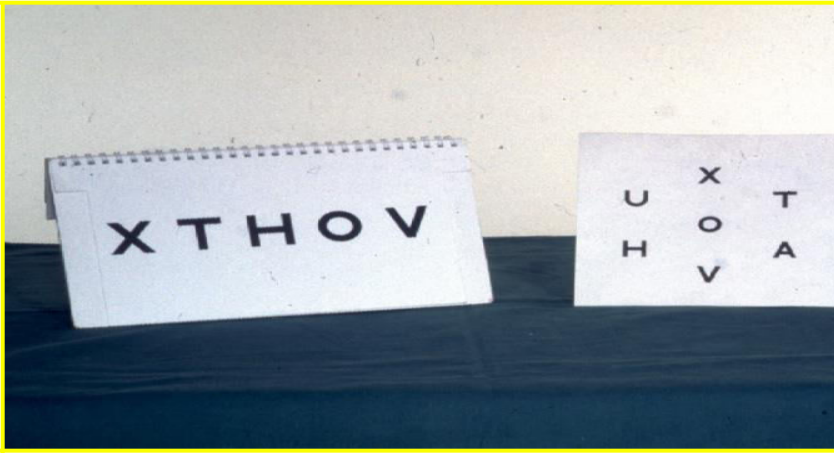
Kay single picture



Multiple pictures

At age 3 years (matching tests)

Sheridan-Gardiner



Sonksen-Silver

Measurement of deviation

- Hirschberg test
- Krimsky test
- Cover tests

Hirschberg test

(1 mm = 7° or 15 △

- Objective measurement of the angle
- Note location of corneal light reflex
- Reflex at border of pupil =15°

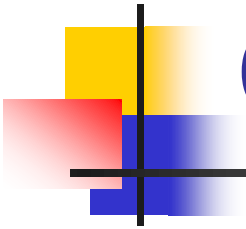
Reflex at the limbus (45° or 90 prism dioptres)

Pseudodeviations

- ***Pseudo esotropia***
- Epicanthic folds
- Short interpupillary distance

- ***Pseudo exotropia***

  wide interpupillary distance



Cover tests

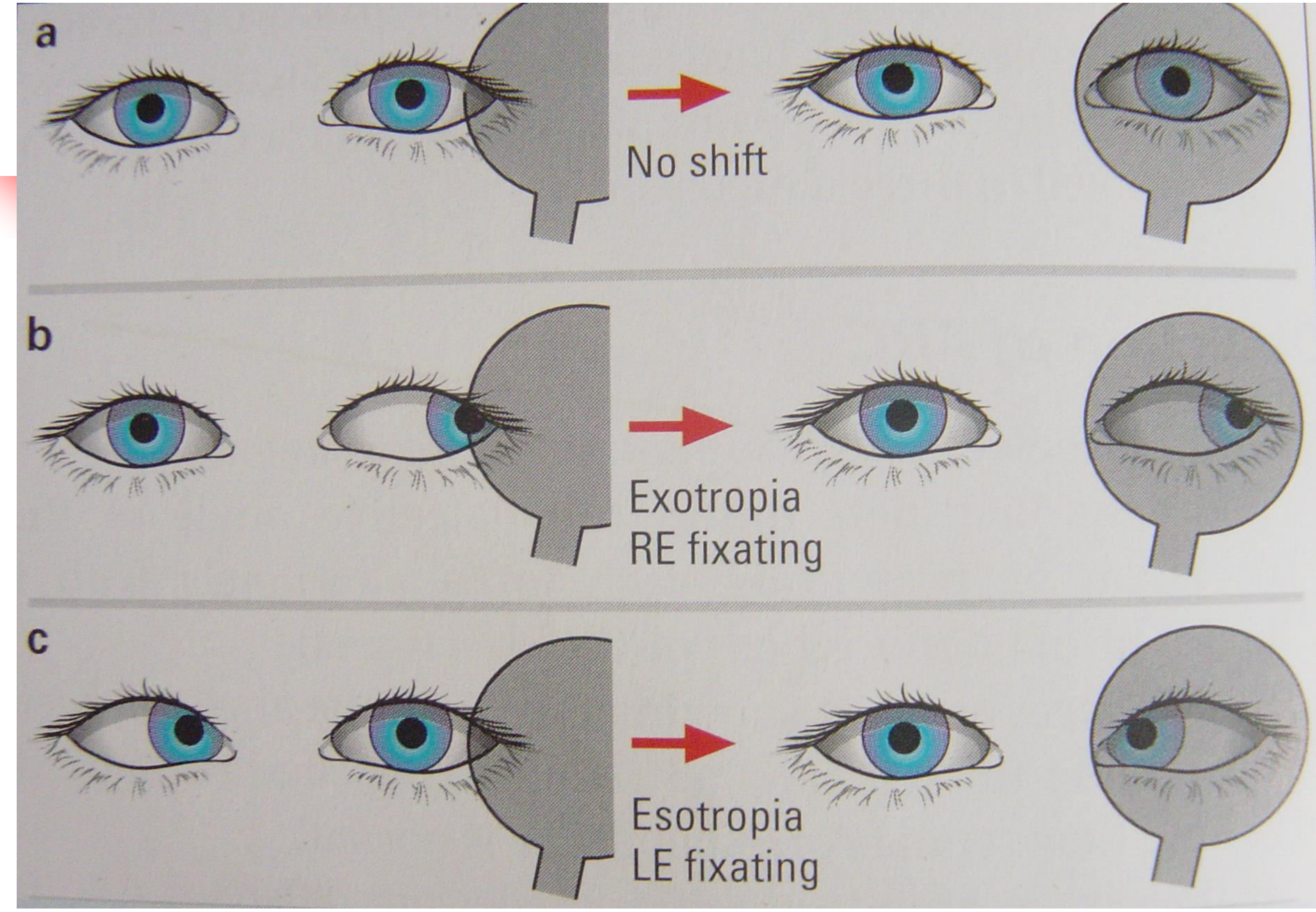
- Cover-uncover test
- Alternate cover test
- Prism cover test

Cover tests

- Most accurate measurement of squint
- Tests are based on ability to fixate
- Differentiate tropia from phorias

Cover tests

- Detect a tropia
- Performed for near and distance
- Patient looks straight ahead
- If right deviation is suspected, cover the left eye and look at the RE,
- No movement means eye is straight or LE has tropia
- Adduction of RE means exotropia, abduction means esotropia , downward movement means hypertropia and upward means hypotropia


a
No shift
b
Exotropia
RE fixating
c
Esotropia
LE fixating

Un cover test

- Detect phoria
- Perform for near and distance
- Cover the RE and after few seconds remove the cover and observe the RE
- No movement means orthophoria, adduction means exophoria, abduction means esophoria

Alternate cover test (phoria and tropia)

- Cover the RE for 2 sec then the LE for 2 sec and do it several times
- After the cover is removed note the uncovered eye
- A person will phoria will have straight eyes before and after and a person with tropia will have manifest deviation

Prism cover test

- Measures the angle of deviation
- Do ACT
- Place prisms in front of one eye and do ACT till the no ocular movement is seen

(base of prism is opposite to deviation)

Motility tests

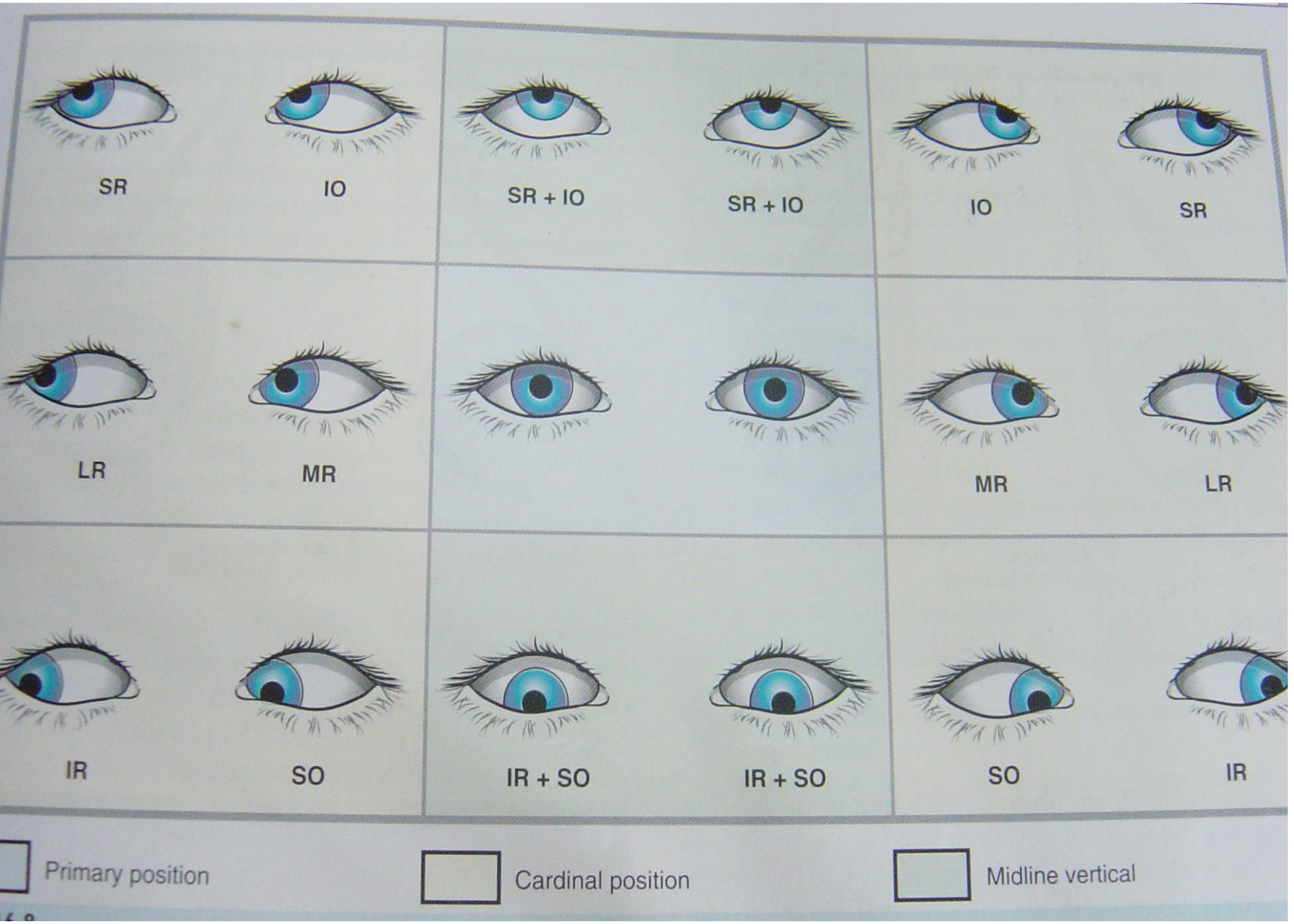
- Smooth pursuit movements
- Saccades

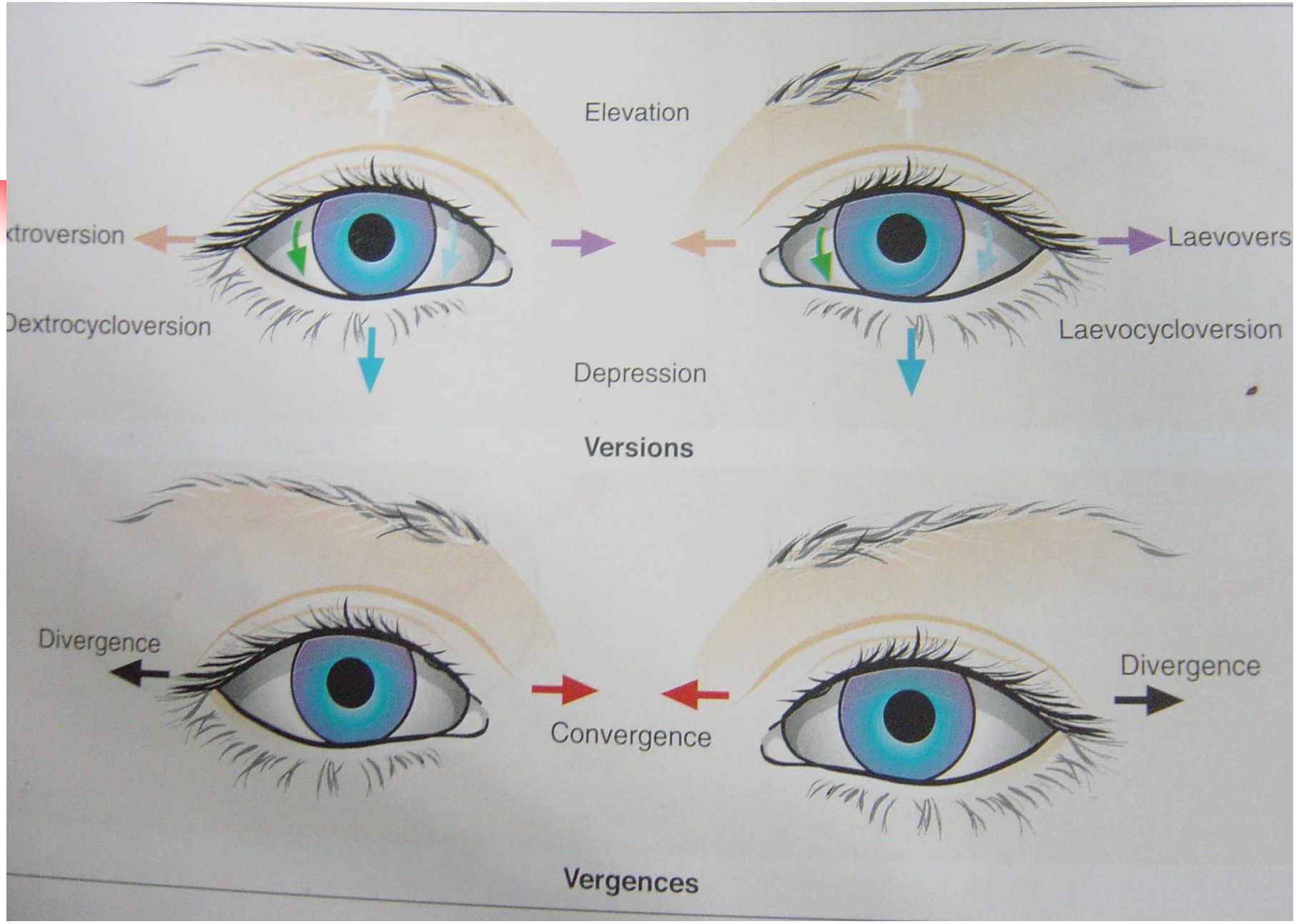
Versions

binocular, conjugate and simultaneous

Ductions

monocular movements


SR
IO
SR + IO
SR + IO
IO
SR
LR
MR
MR
LR
IR
SO
IR + SO
IR + SO
SO
IR
Primary position
Cardinal position
Midline vertical


Elevation
xtroversion
Laevovers
Dextrocycloversion
Laevocycloversion
Depression
Versions
Divergence
Divergence
Convergence
Vergences

FUNDOSCOPY

- MANDATORY (NEVER MISS)
- Squint may be due to poor vision as in

  macular scarring

  optic disc hypoplasia

  retinoblastoma (20%)

Cycloplegic refraction

- Commonest cause of squint is refractive errors
- Cycloplegia is done to negate the effect of accomodation
- Cyclopentolate 1% , 0.5%
- Atropine

TYPES OF STRABISMUS

CONCOMITANT

INCOMITANT

TERMINOLOGY

Strabismus- from Greek word "strabismos"- to look obliquely- ocular misalignment

- Orthophoria- ideal condition of ocular balance

  both eye remain aligned in all positions of gaze and all distances of the fixation point even when the fusional mechanism is disrupted

TERMINOLOGY

- Comitant (concomitant): the deviation does not vary with direction of gaze or fixating eye

- Incomitant (non-comitant); the direction varies with direction of gaze or fixating eye

  Mostly paralytic or restrictive

CONCOMITANT STRABISMUS

The variability of angle of deviation is within 5 prism dioptres in different direction of gaze

In an Incomitant squint the angle differs in various positions of gaze as a result of

Abnormal innervation

Restriction

TYPES OF CONCOMITANT STRABISMUS

- ESOTROPIA
- EXOTROPIA

ESOTROPIA (Manifest convergent squint)

- Accommodative
- Non-accommodative

Accommodative

- Refractive
- Non-refractive
- Mixed accommodative

FULLY ACCOMODATIVE

- Completely corrected by optical correction of hypermetropia,

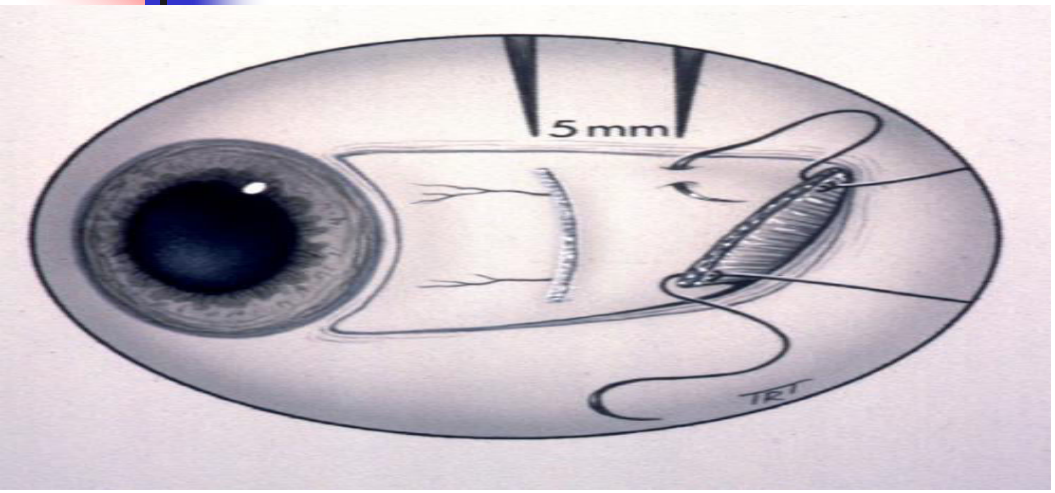
While partially accommodative is reduced but not eliminated by correction of Hypermetropia

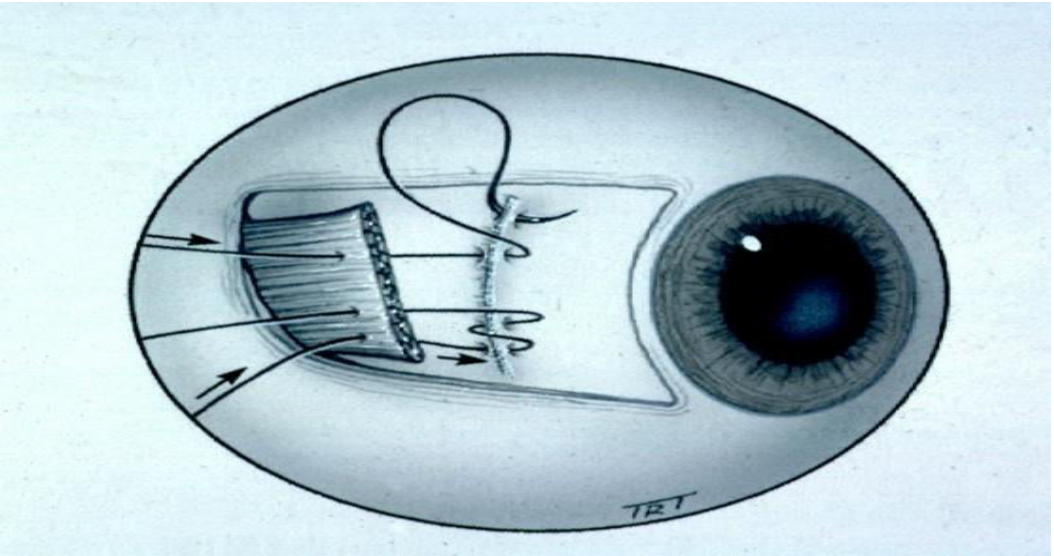
Non-refractive accommodative esotropia

- Straight for distance

- Squint for near

SURGERY





- When specs cant correct deviation
- Weaken the MR and strengthen the LR

Exotropia (manifest divergent squint)

- CONSTANT
- INTERMITTENT

CONSTANT

- Congenital
- Sensory
- Consecutive

Congenital

- Presents at birth
- Large angle
- Alternating fixation
- Normal refraction for age
- Neurological anomalies may be there
- Treatment is surgical

SENSORY

Disruption of binocular reflexes by

acquired lesions, such as cataract in over 5 years and in adults

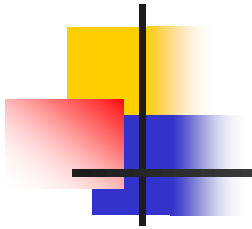
Correct the visual deficit followed by surgery

Consecutive

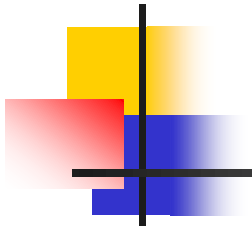
follows previous surgery for esotropia

Intermittent (around 2 years)

- Basic
- Convergence weakness
- Divergence excess



- When exophoria breaks under visual inattention, bright light, fatigue or ill health



- BASIC

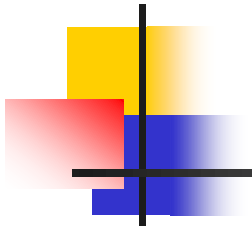
  Deviation is same for distance and near

- Convergence weakness

  adults or older kids

  angle more for near

  may be associated with Myopia



- Divergence excess
  angle is more for distance

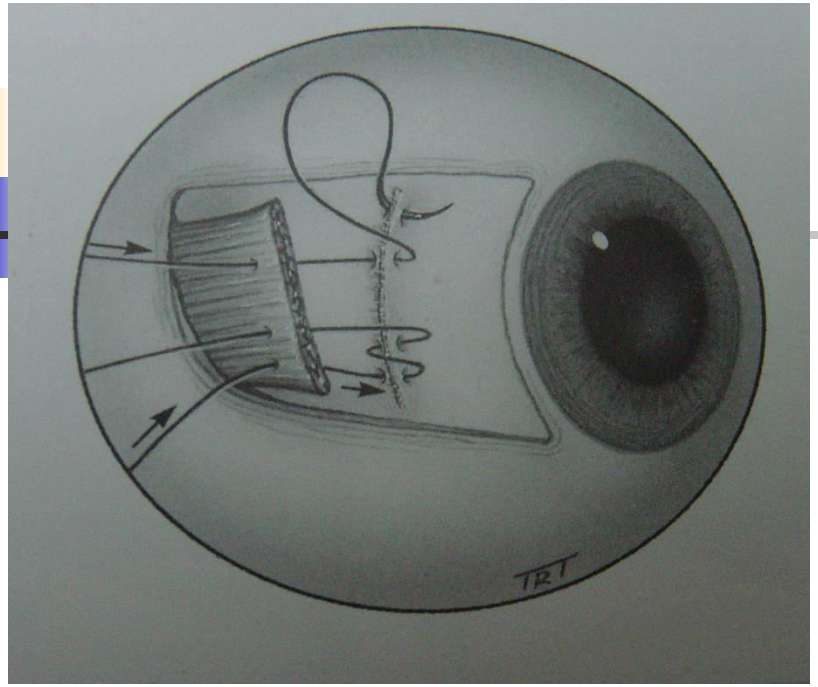
management

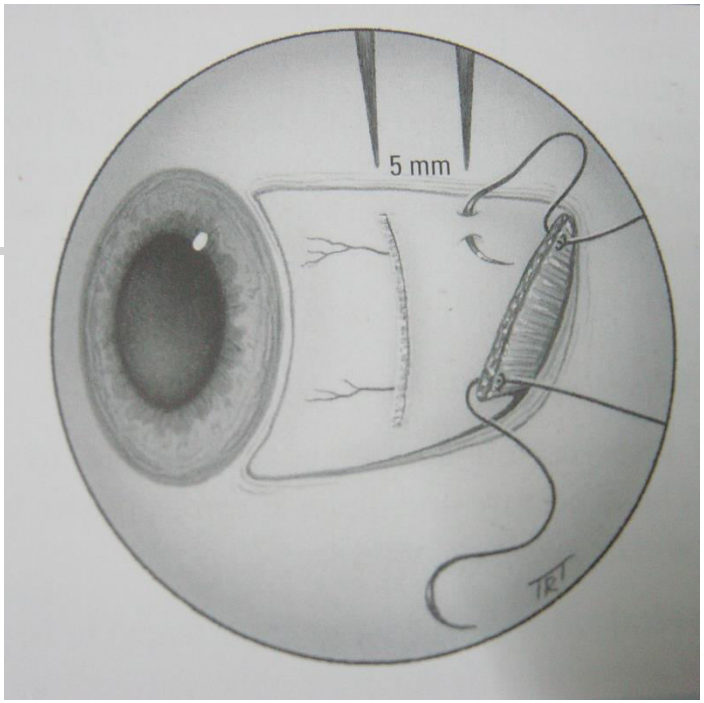
- Correct myopia
- Orthoptic treatment
- Surgery

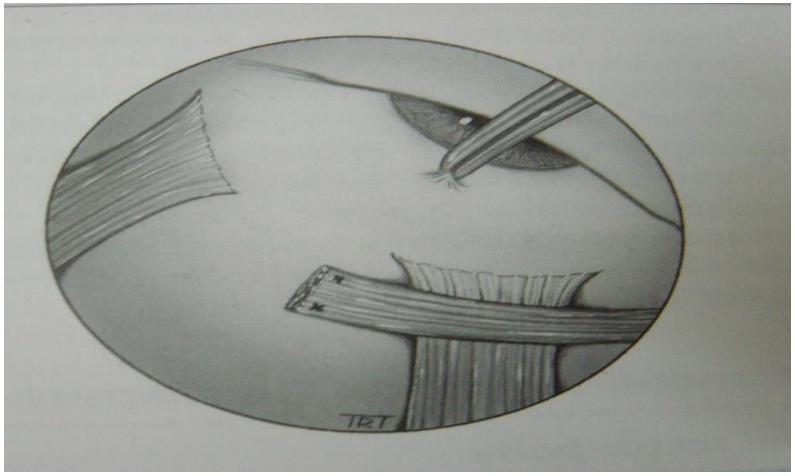
PRINCIPLES OF SURGERY

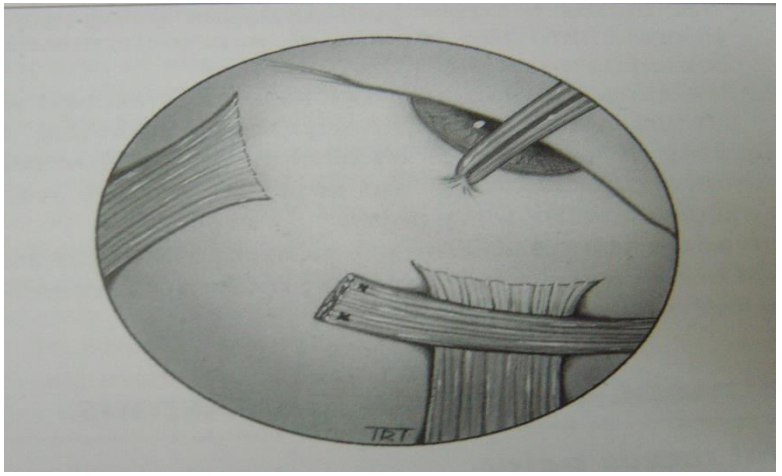
- Weakening procedures
  - Recession
  - Myectomy
  - Posterior fixation suture

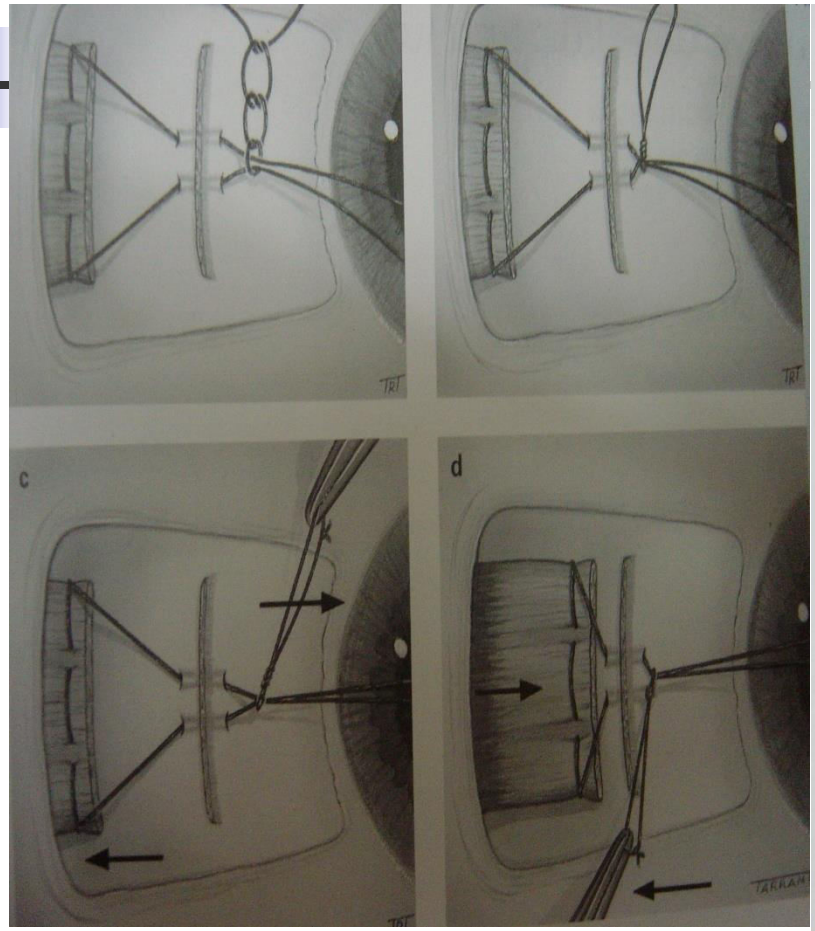
- Strengthening procedures
  - Resection
  - Advancement
  - Tucking

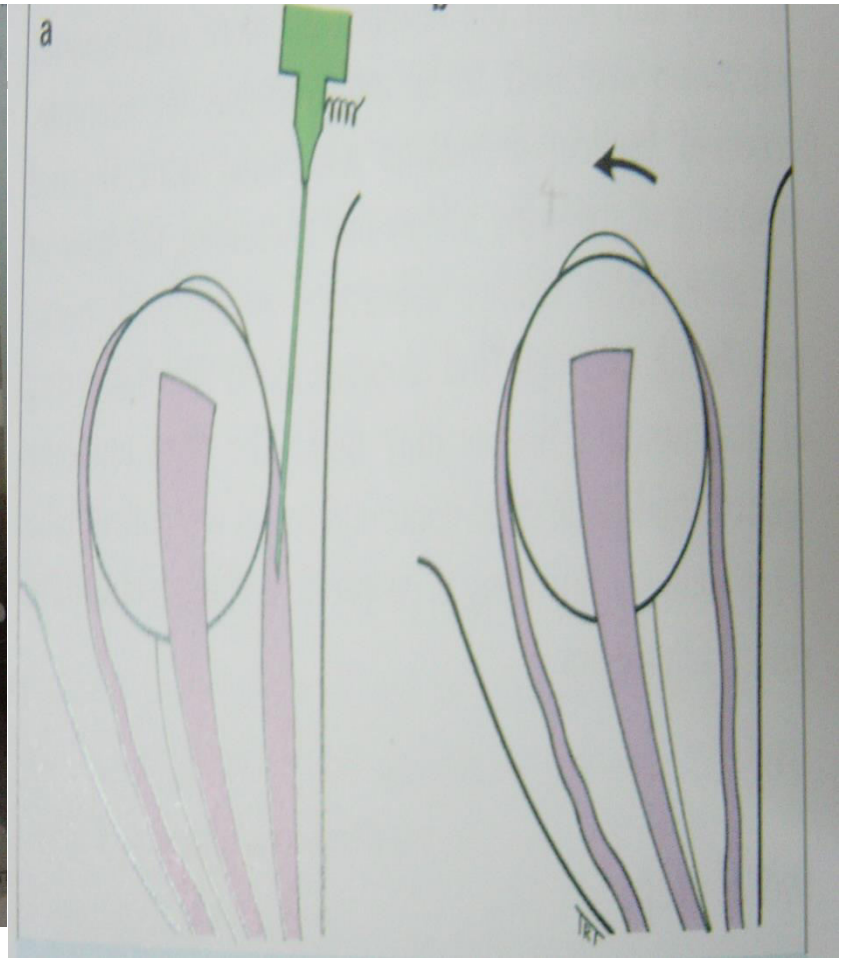

TRT


5 mm
TRT


TRT


TRT

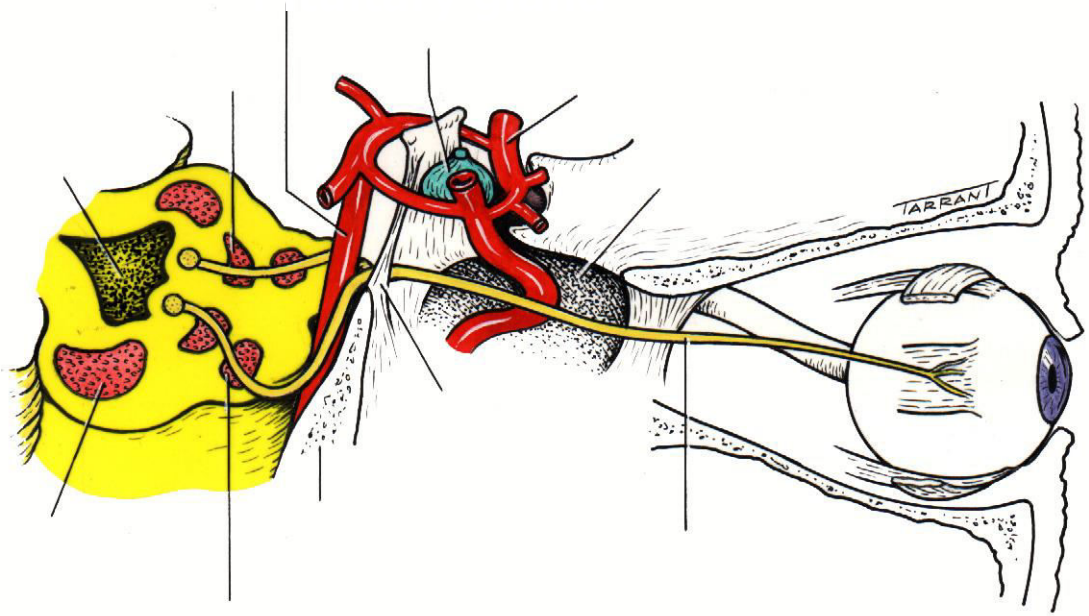

c
d


a

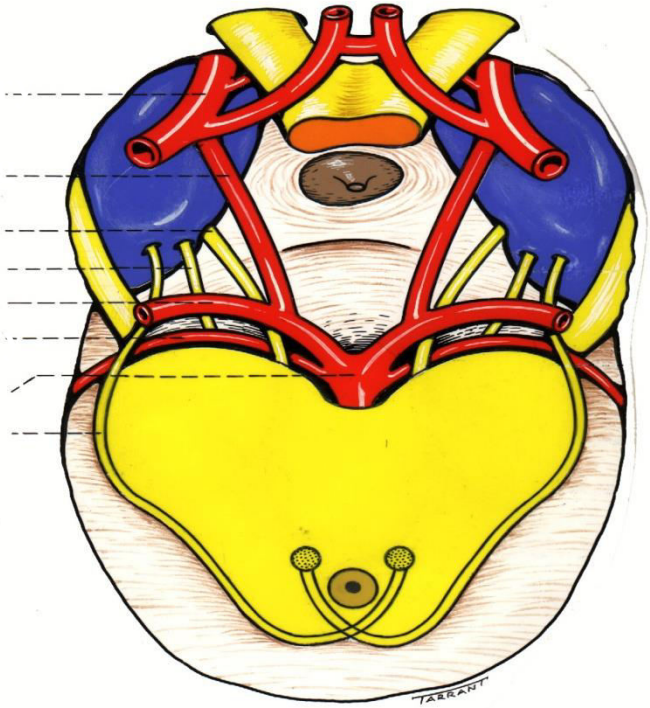
Types of Incomitant squint

- Paralytic
  - LR Palsy
  - SO Palsy
  - 3rd nerve palsy

Anatomy of the 6th nerve



Anatomy of fourth nerve



- **Only cranial nerve to emerge dorsally**
- **Crossed cranial nerve**
- **Very long and slender**

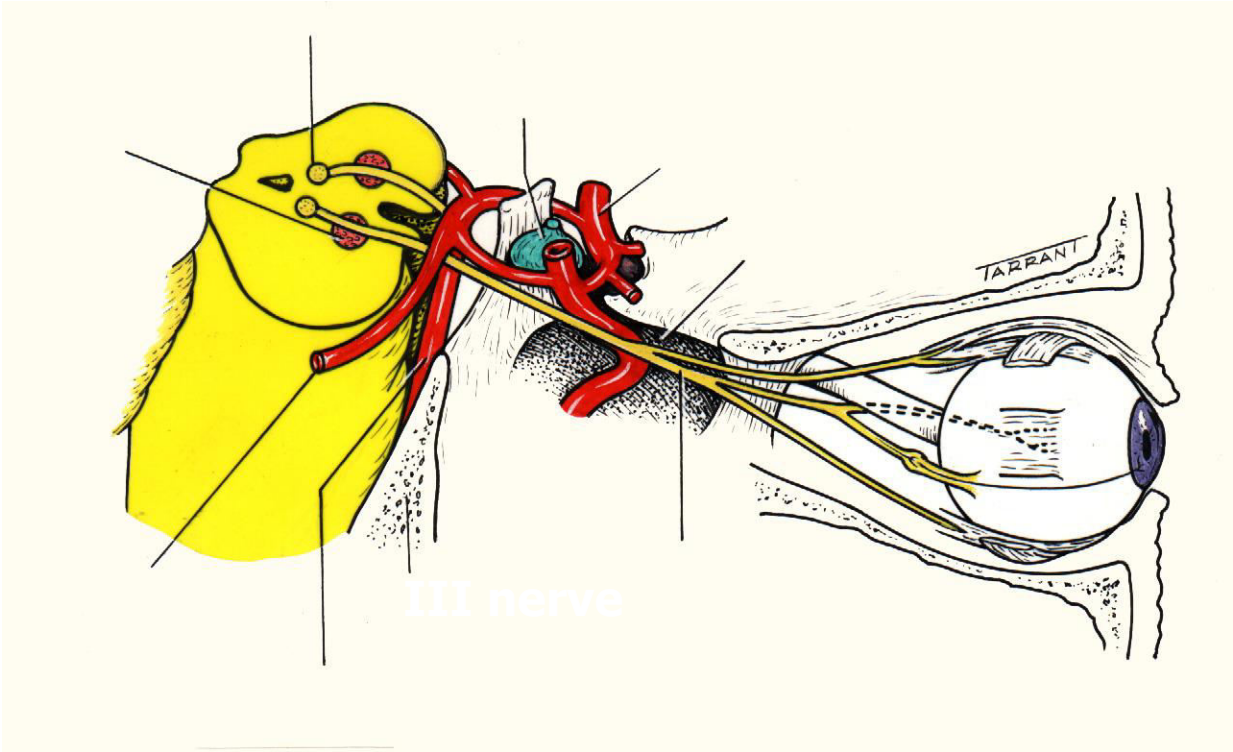
- Righthyperdeviation in primary position when left eye fixating

- Right underaction on depression in adduction

- Right overaction on left gaze

- Increase in right hyperdeviation on ipsilateral head tilt

Anatomy of 3rd nerve



Clinical signs of 3rd nerve palsy

- **Ptosis, mydriasis and cycloplegia**
- **Abduction in primary position**
- **Limited depression and elevation**

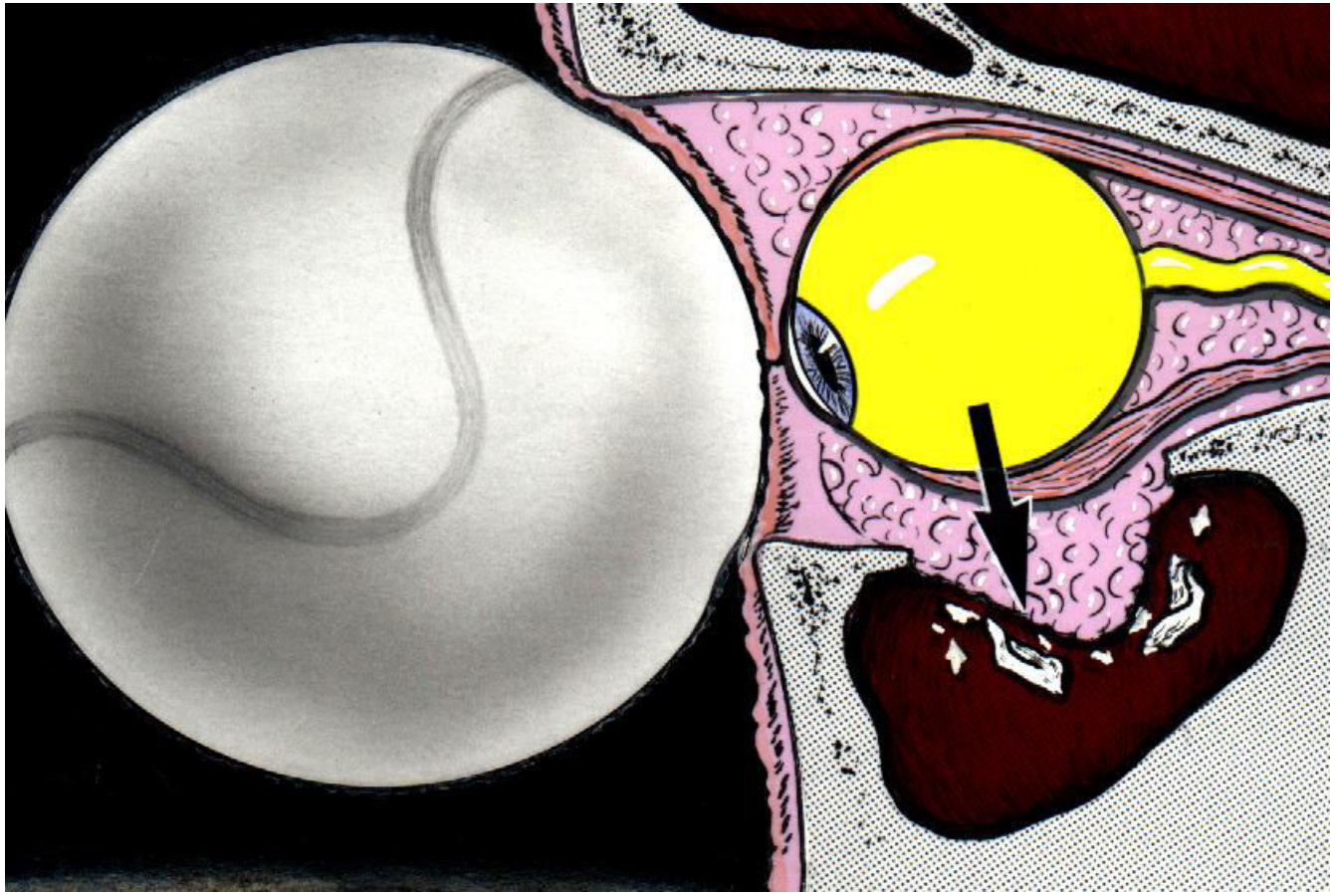
Restriction

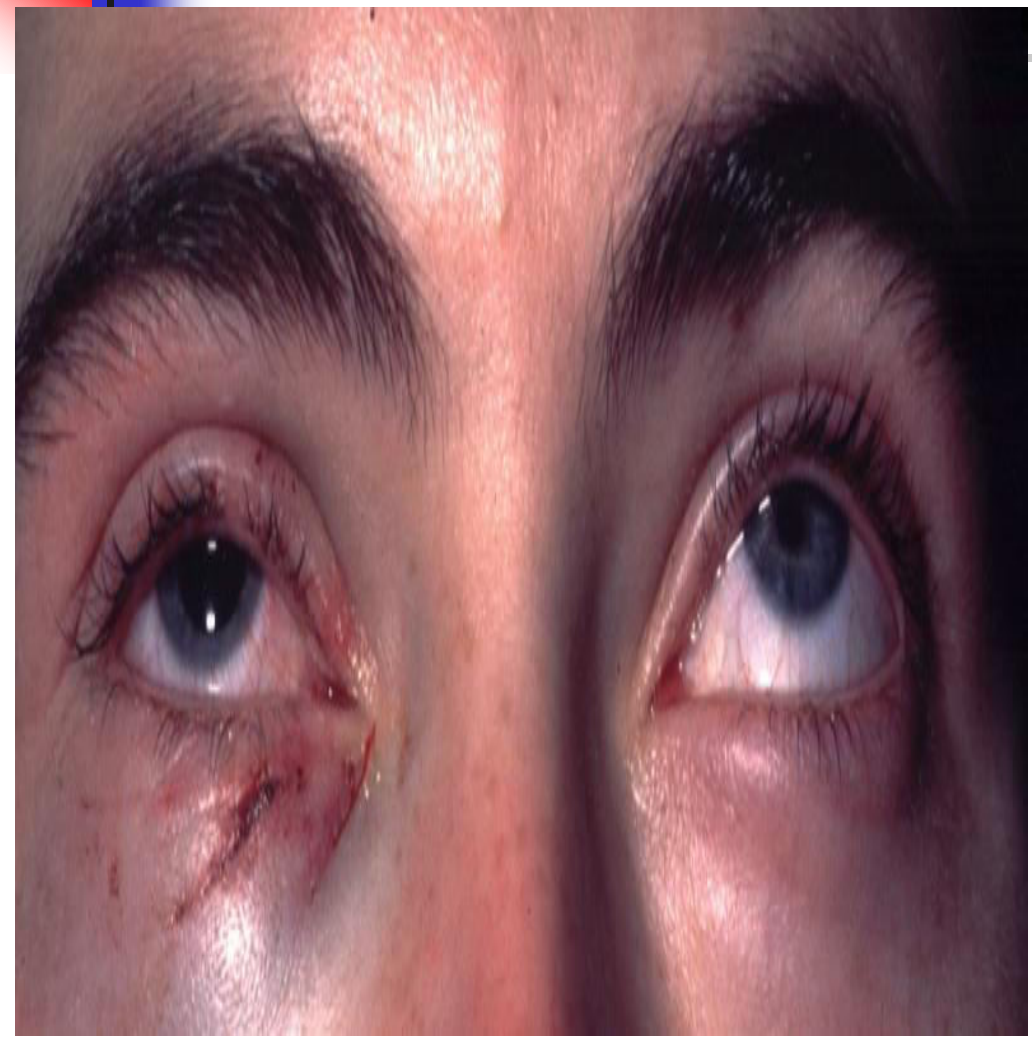
Blow out fractures

muscle entrapment

thyroid ophthalmopathy

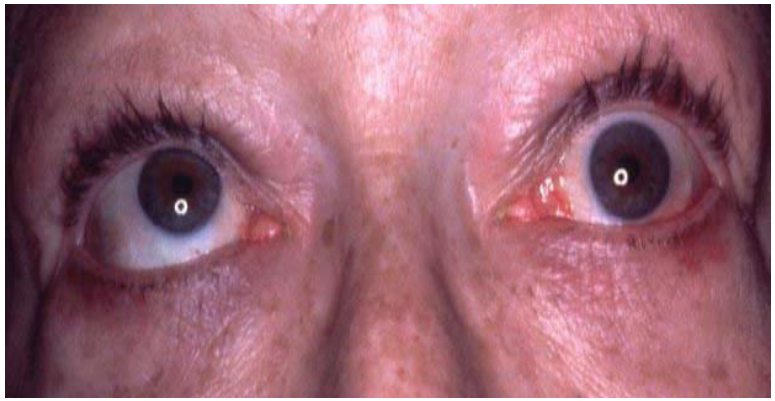
Blow out fracture of orbital floor

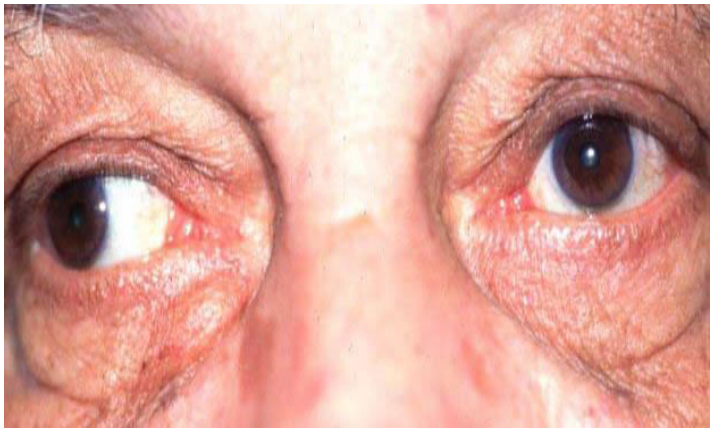


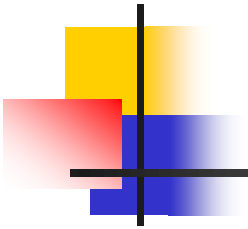


- Diplopia in up and down gaze

Types of restriction in thyroid eye disease



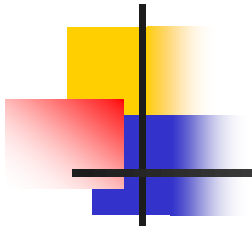




- **Special syndromes**

Duane syndrome

- On attempted adduction - retraction of globe and narrowing of palpebral fissure
- On attempted abduction - opening of palpebral fissure and normal globe position
- Bilateral in about 20%



- There is co contraction of both MR and LR
- There may be deafness and other congenital abn
- May be tight LR or absent Abducent nucleus

Brown syndrome

- Congenital

  idiopathic, congenital click syndrome
- Acquired

  iatrogenic

  inflammation of the tendon

Brown syndrome (right)

- **Limited elevation in adduction**

Double elevator palsy (right)

- **Unilateral elevation failure in all positions**

Mobius syndrome

- Bilateral sixth nerve palsies
- Primary position - 50% straight, 50% esotropic
- Paresis of 9th and 12th cranial nerves