strabismus

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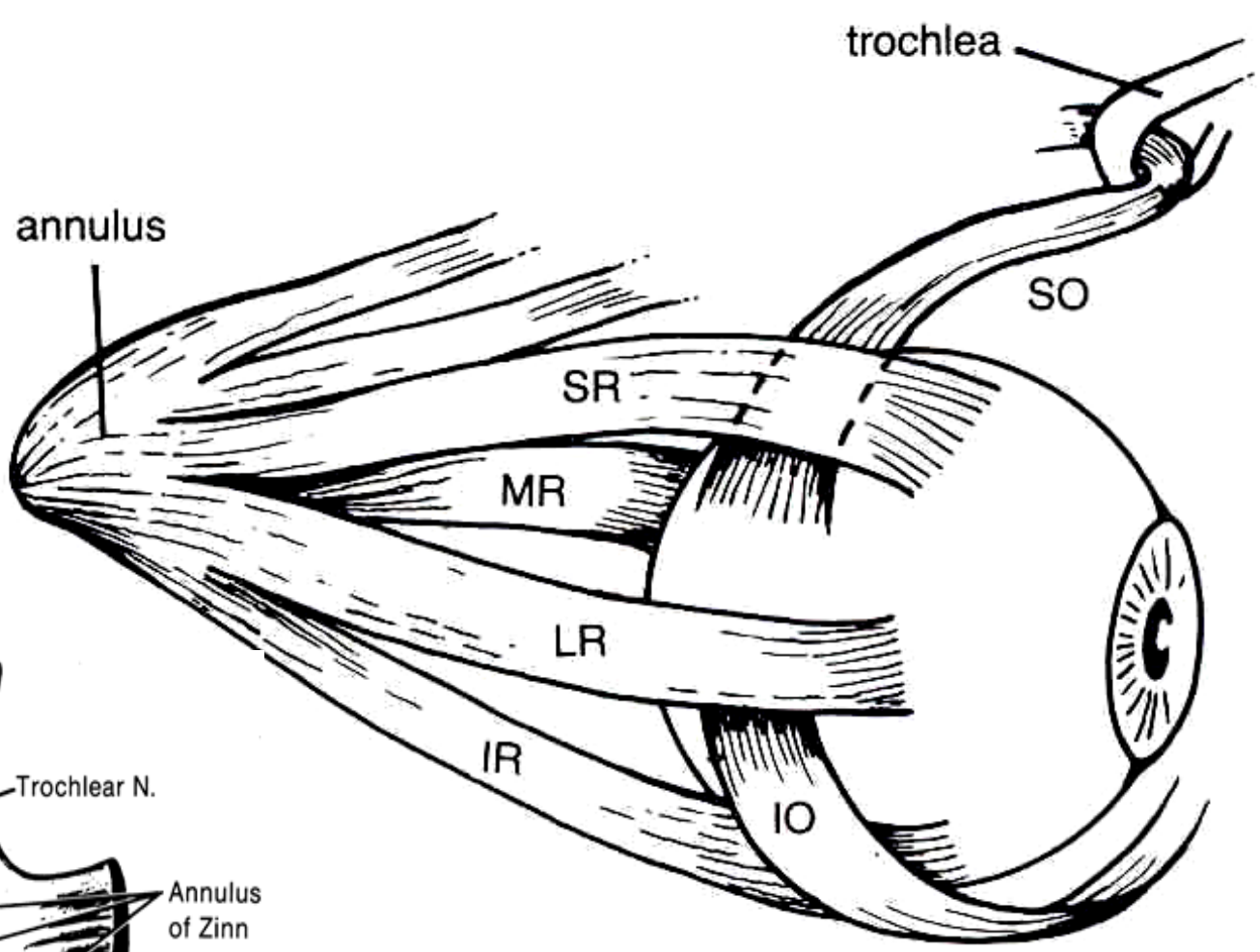
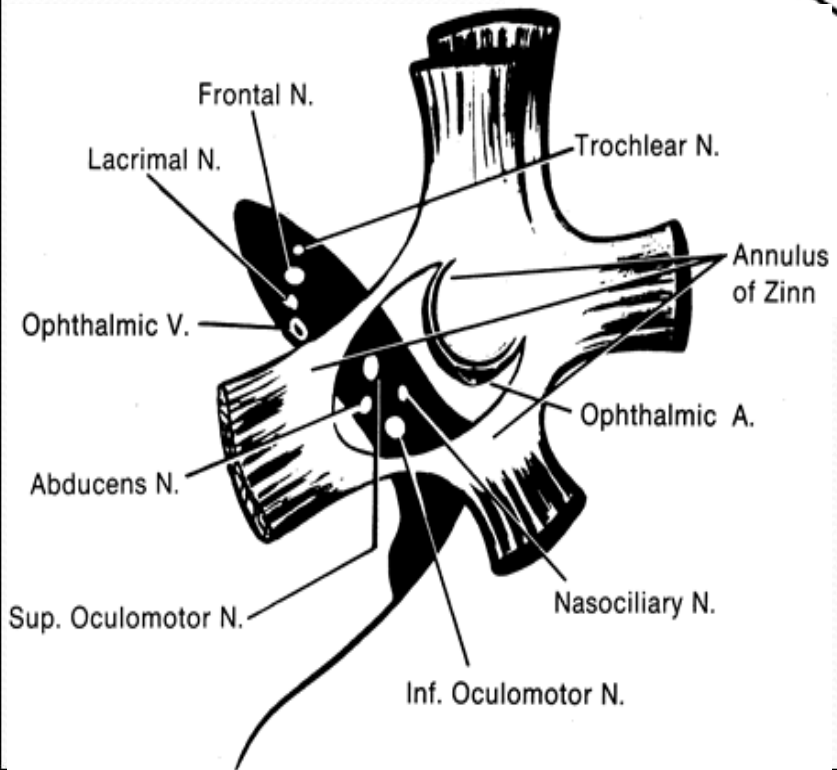
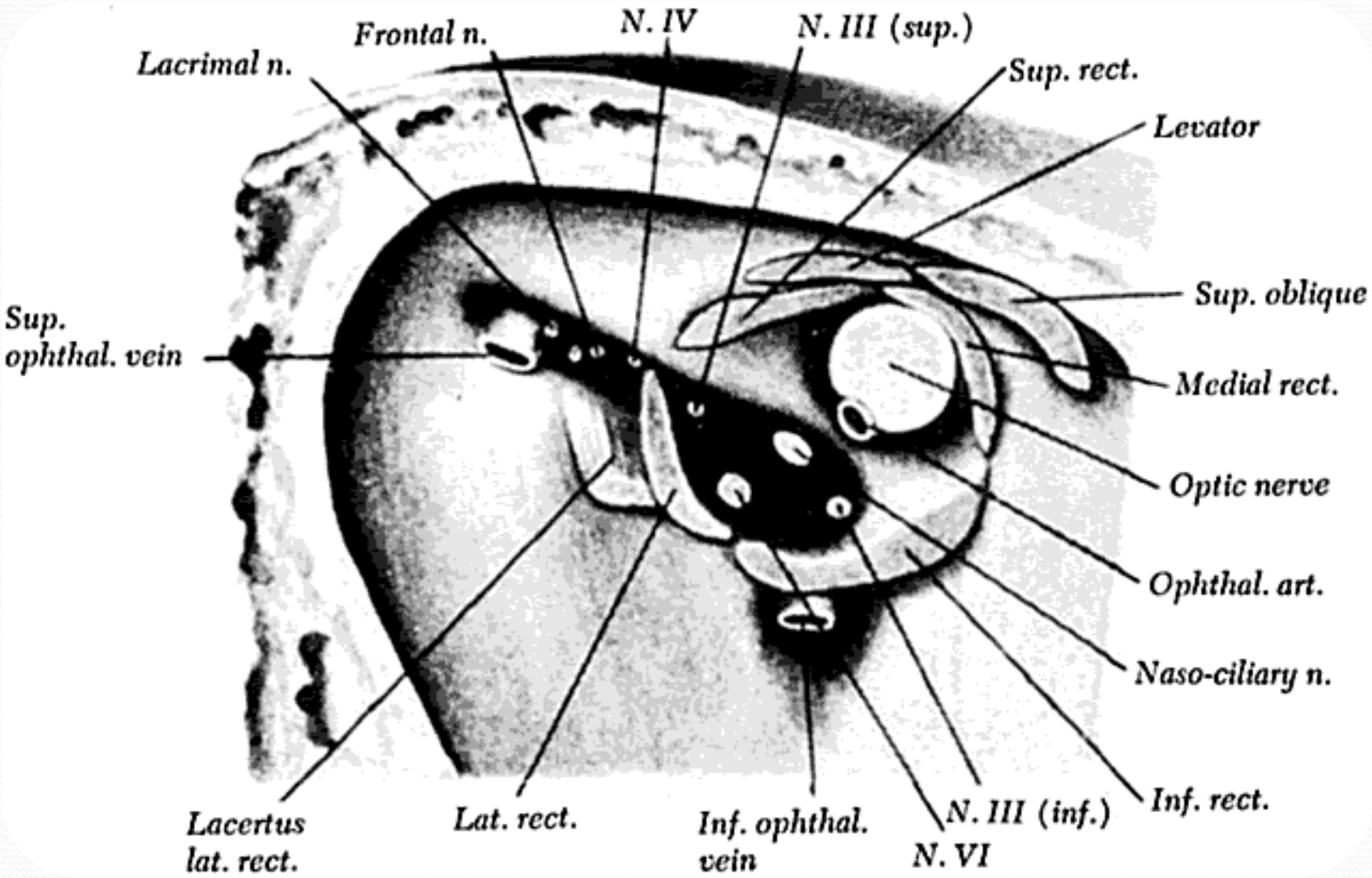
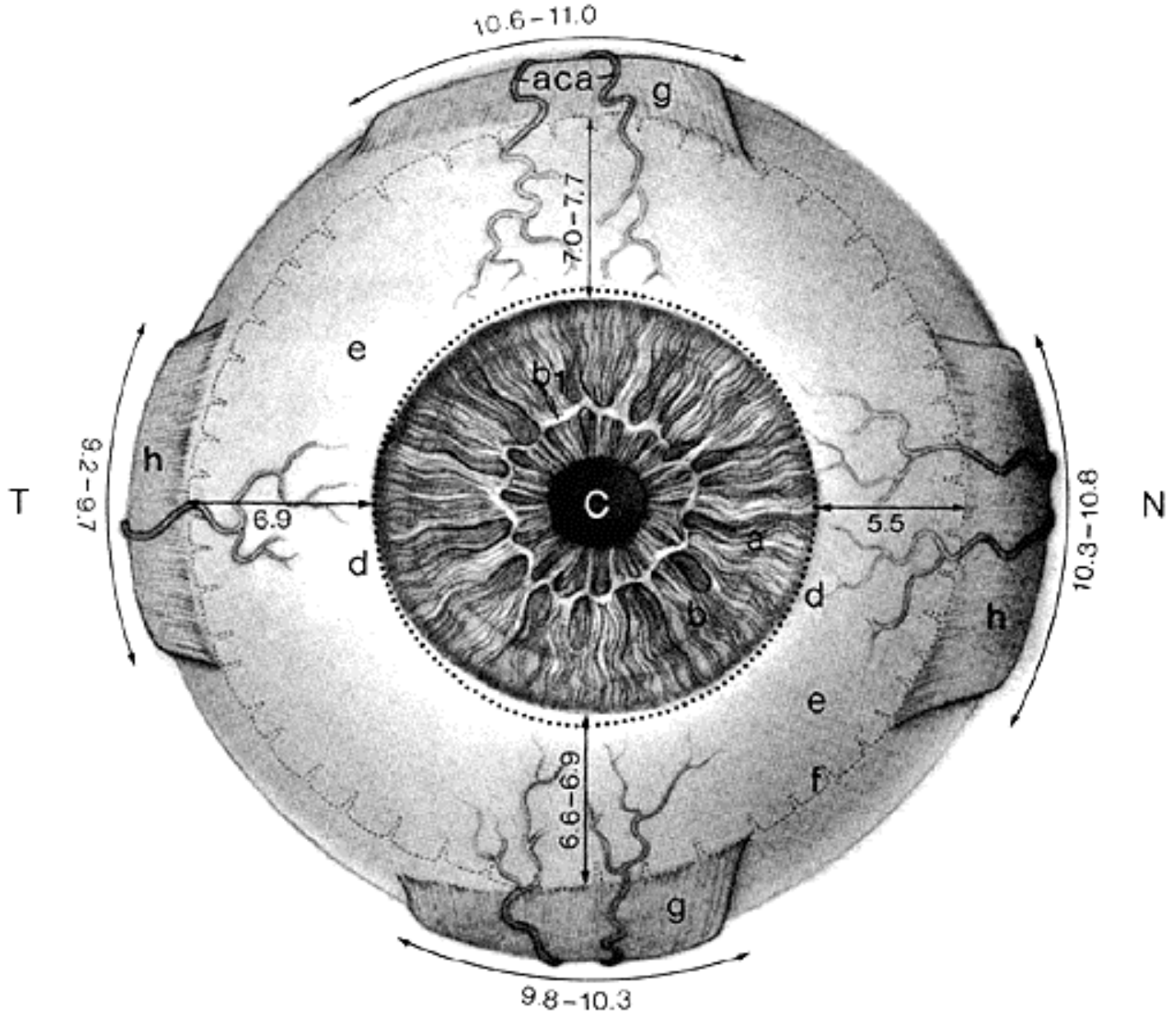
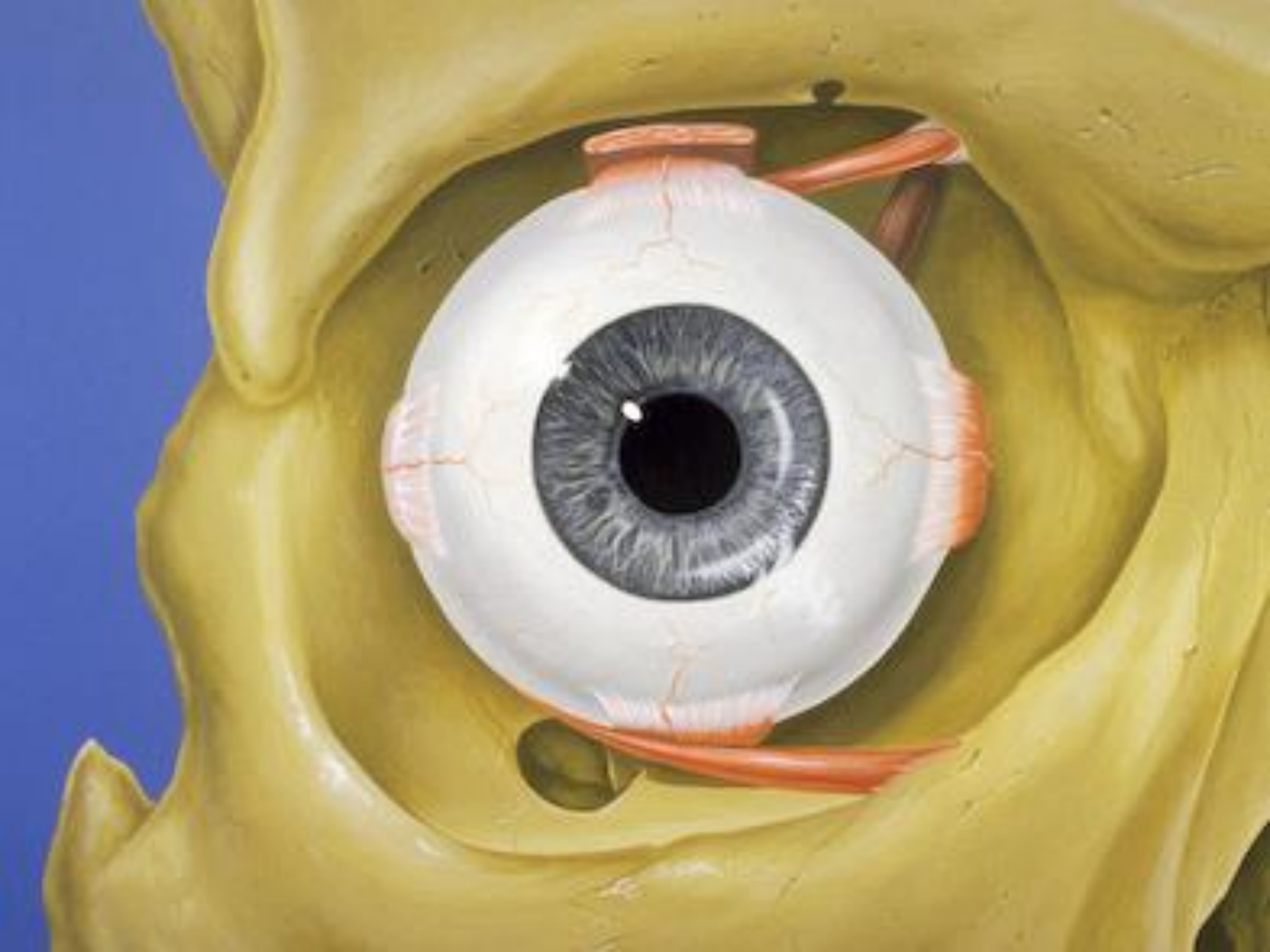
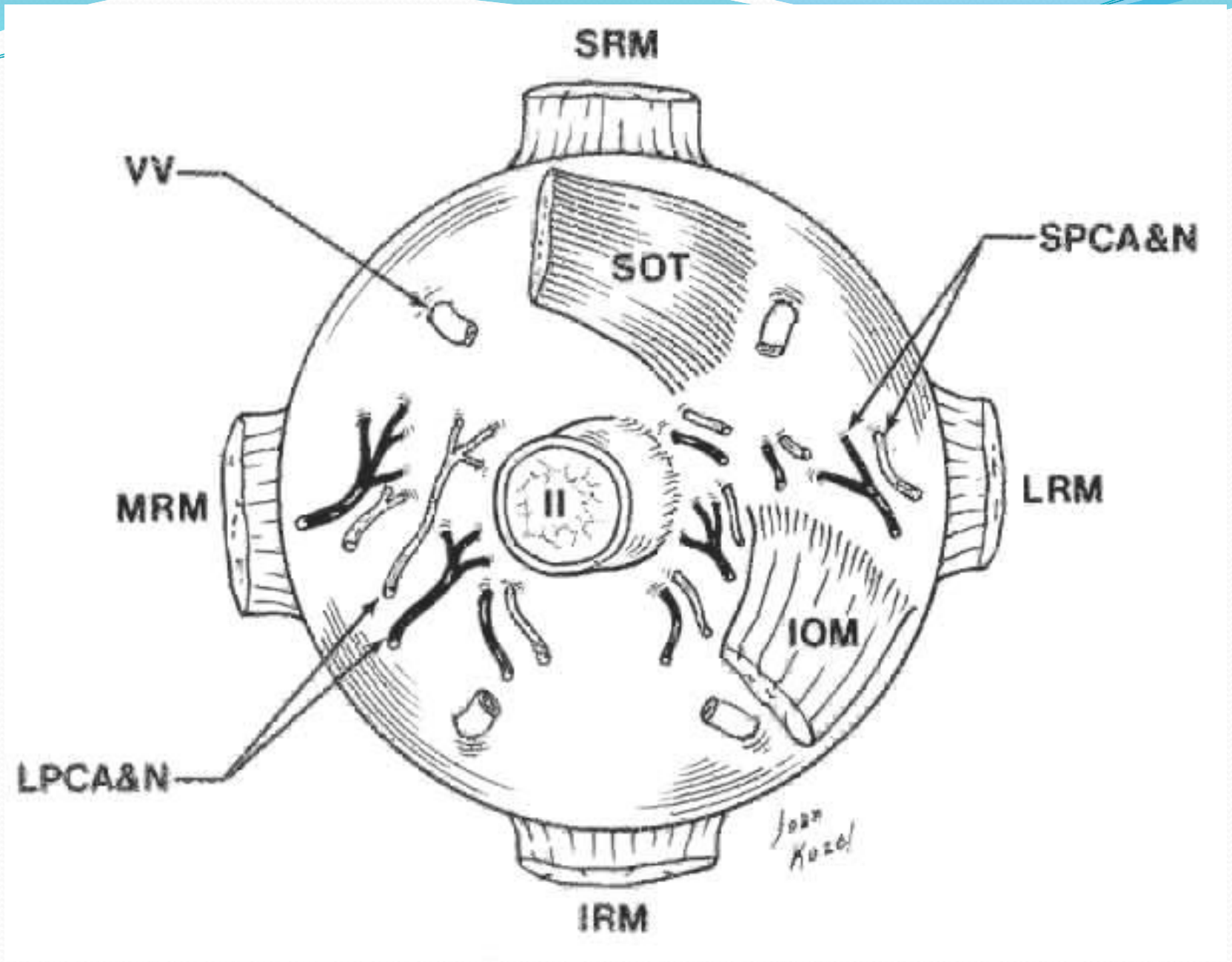

trochlea
annulus
SO
SR
MR
LR
IR
IO

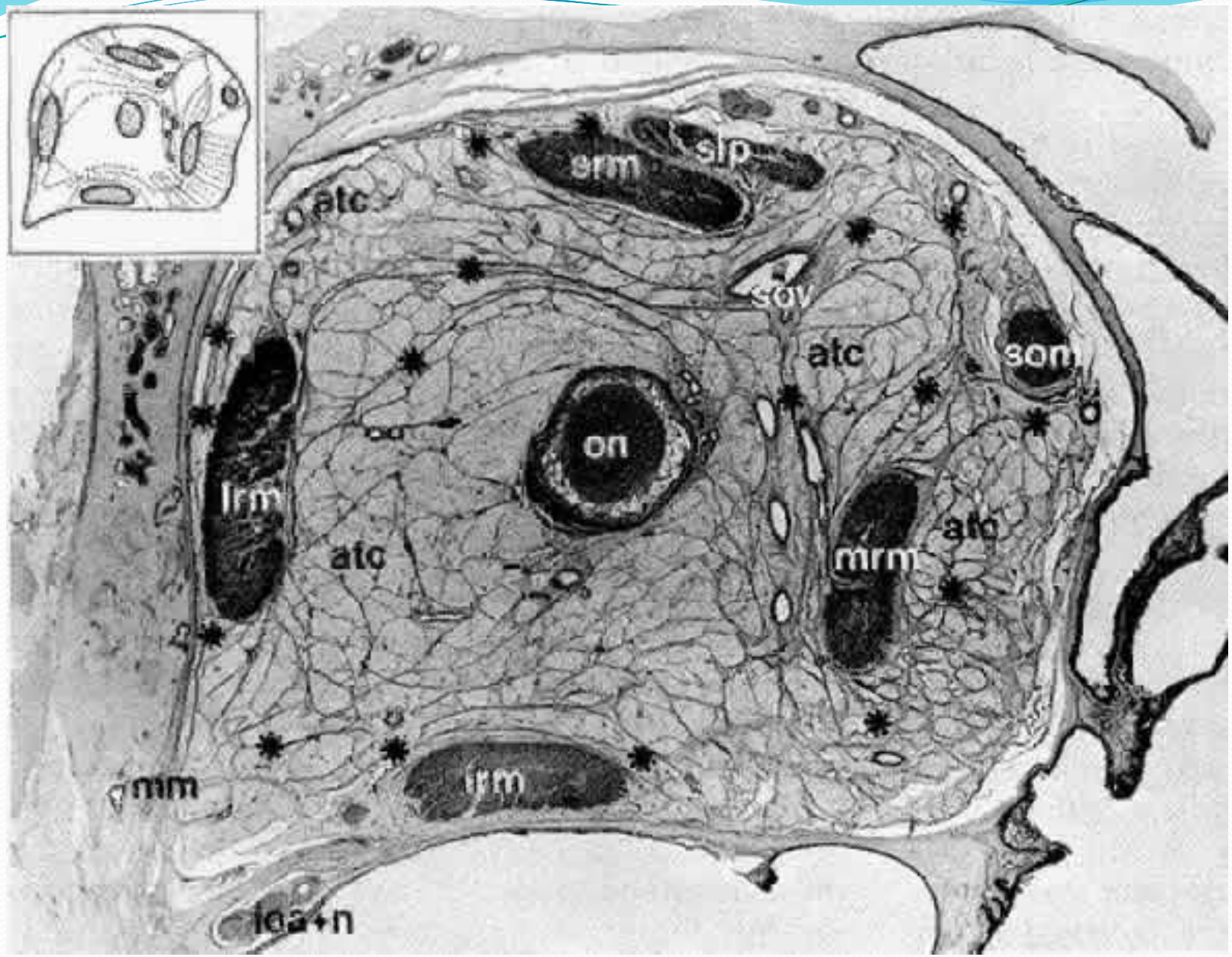

Frontal N.
Lacrimal N.
Trochlear N.
Annulus
of Zinn
Ophthalmic V.
Ophthalmic A.
Abducens N.
Sup. Oculomotor N.
Nasociliary N.
Inf. Oculomotor N.


Lacrimal n.
Frontal n.
N. IV
N. III (sup.)
Sup. rect.
Levator
Sup. oblique
Sup. ophthal. vein
Medial rect.
Optic nerve
Ophthal. art.
Naso-ciliary n.
Inf. rect.
Lacertus lat. rect.
Lat. rect.
Inf. ophthal. vein
N. III (inf.)
N. VI


10.6–11.0
aca
g
7.0–7.7
e
b1
T
9.2–9.7
h
6.9
C
5.5
N
10.3–10.8
d
a
b
d
h
e
f
6.9–9.6
g
9.8–10.3

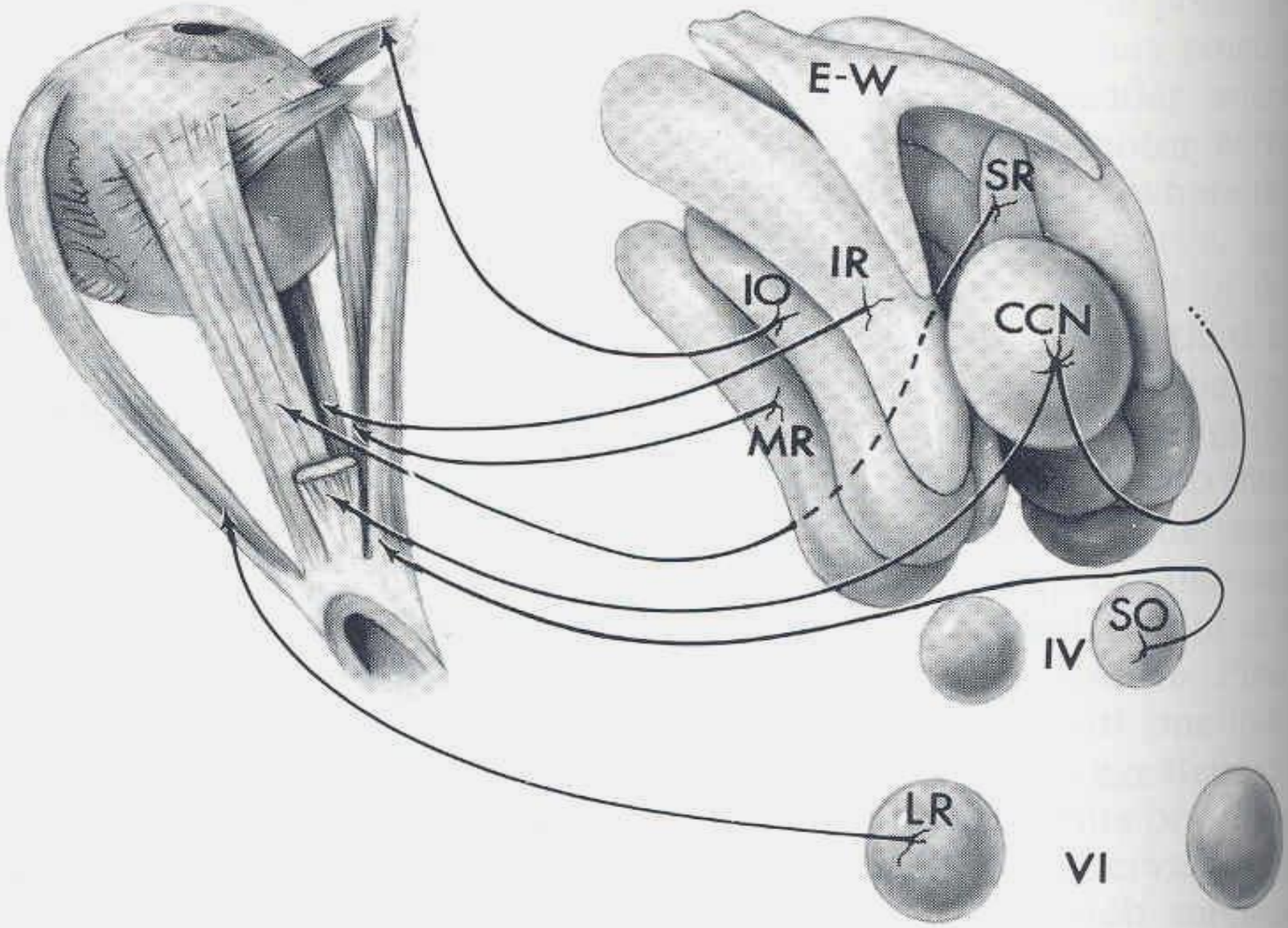


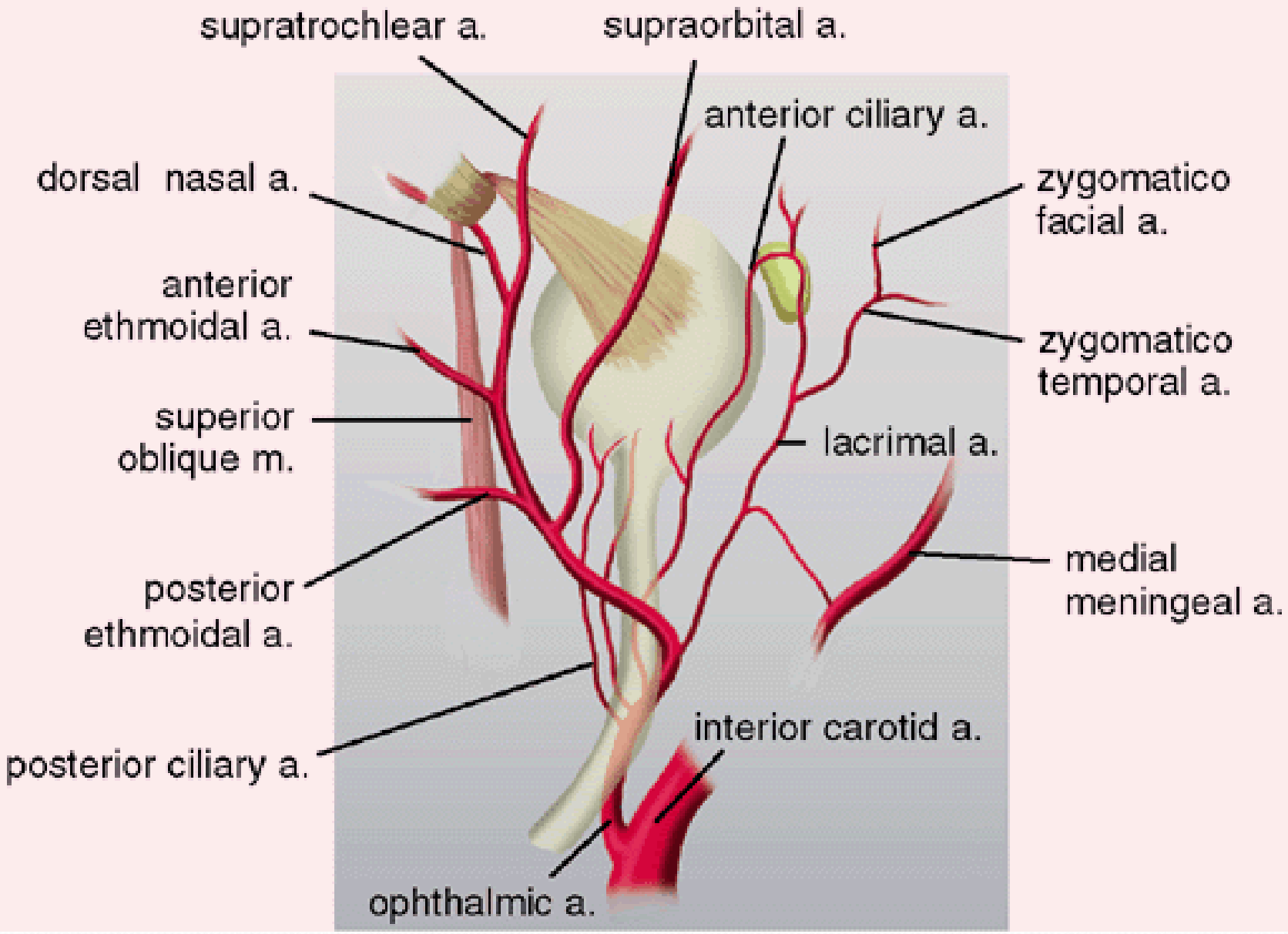

SRM
VV
SOT
SPCA&N
MRM
II
LRM
IOM
LPCA&N
IRM


srm
slp
atc
sov
atc
som
on
lrm
atc
mrm
atc
mrm
irm
lda+n

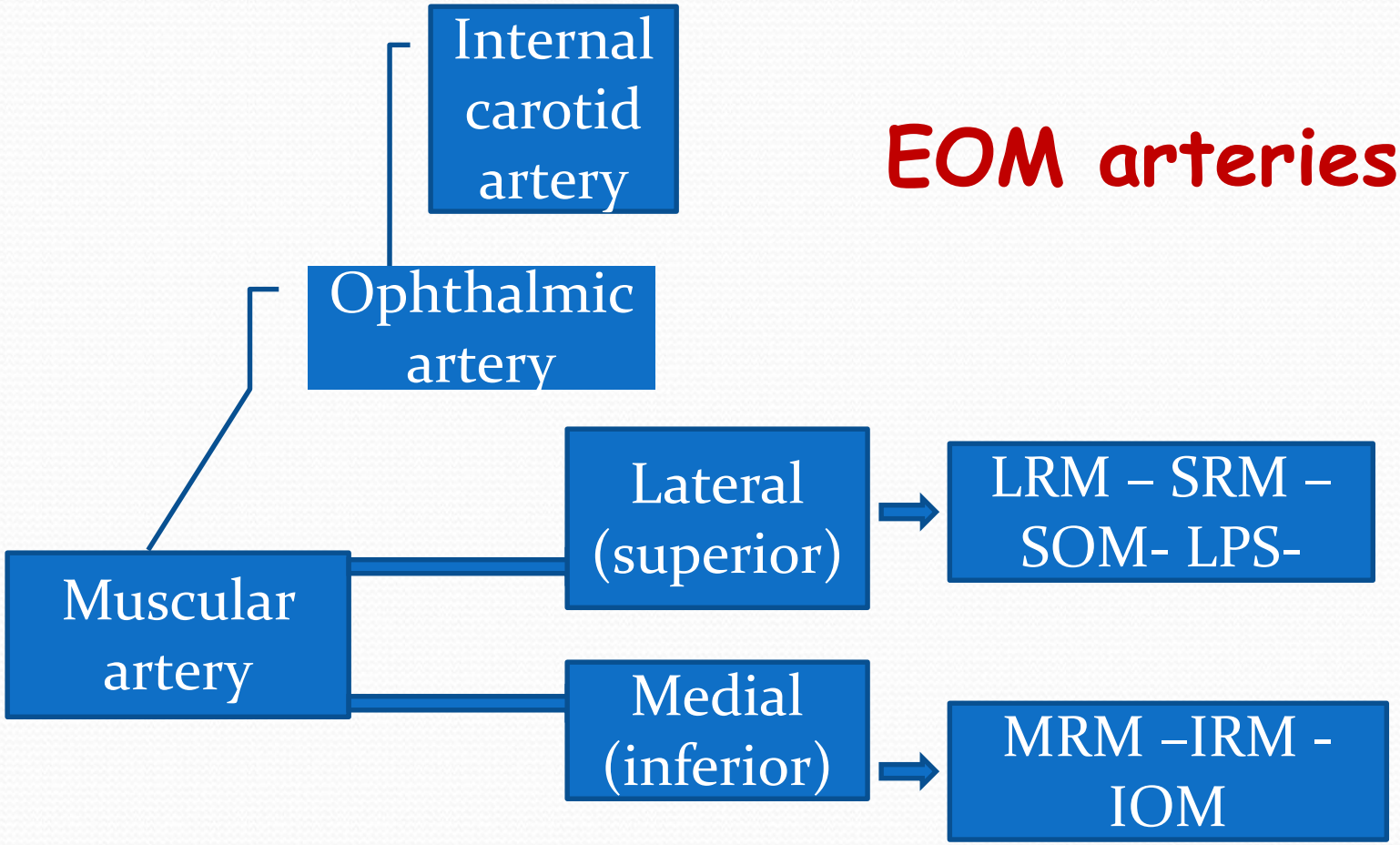
Extraocular muscle function

Muscle	primary	secondary	Tertiary
Medial rectus	Adduction	----------	----------
Lateral rectus	Abduction	----------	----------
Inferior rectus	Depression	Excycloduction	Adduction
Superior rectus	Elevation	Incycloduction	Adduction
Inferior oblique	Excycloduction	Elevation	Abduction
Superior oblique	Incycloduction	Depression	Abduction

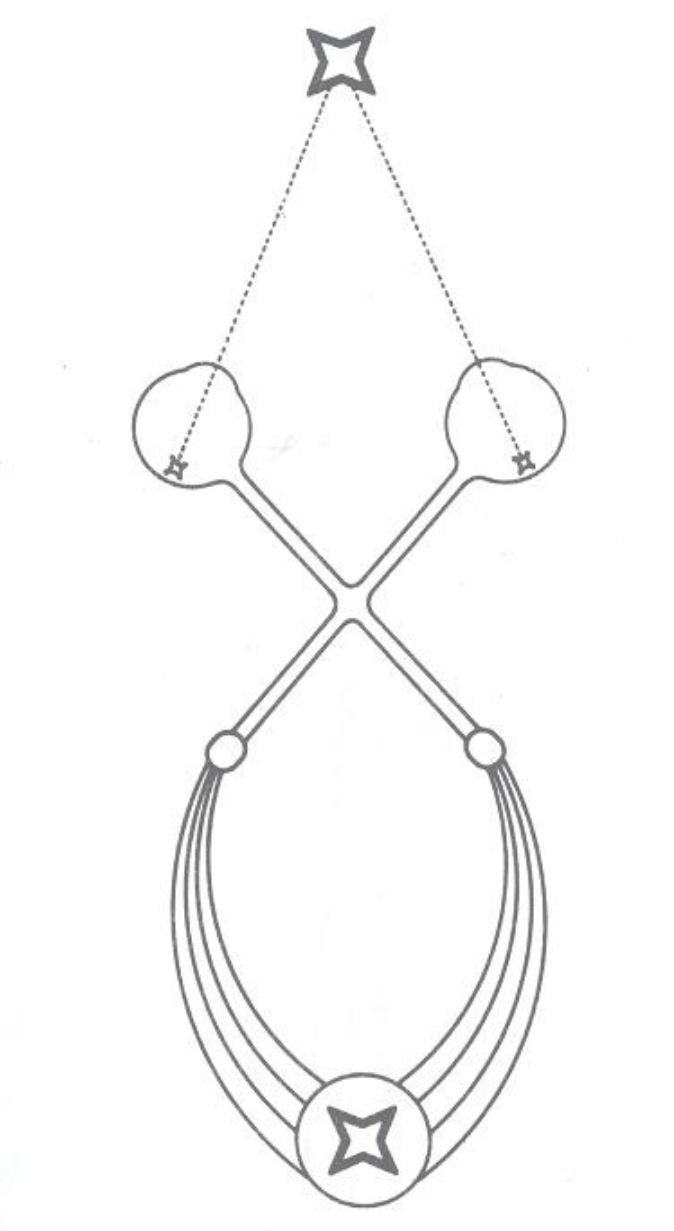

E-W
SR
IR
IO
CCN
MR
IV
SO
LR
VI


supratrochlear a.
supraorbital a.
anterior ciliary a.
dorsal nasal a.
zygomatico facial a.
anterior ethmoidal a.
zygomatico temporal a.
superior oblique m.
lacrimal a.
medial meningeal a.
posterior ethmoidal a.
interior carotid a.
posterior ciliary a.
ophthalmic a.

EOM arteries



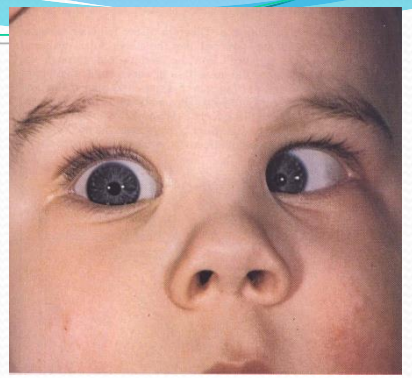
Fusion



Strabismus =Ocular deviation

- Tropia ,Phoria ,Intermittent tropia
- Comitant , Incomitant
- Primary, Secondary
- Unilateral, Alternate

- Esodeviation (esophoria, esotropia, intermittet esotropia)



- Exodeviation (exophoria ,exotropia , intermittent exotropia)

- Hypedeviation or hypodeviation

Relationship of EOMs:

Synergists (Agonists)

Cooperative muscles in an eye to produce a special function

Antagonists

Opposite acting muscles in an eye

Yoke

Cooperative muscles in both eyes to produce a special version

Synergist and antagonist muscles

Agonist	Synergist	Antagonist
Medial rectus	SRM- IRM	LR –SO- IOM
Lateral rectus	SOM - IOM	IRM –MRM -SRM
Superior rectus	IOM -MRM	IRM- SOM
Inferior rectus	SOM -MRM	SRM -IOM
Superior oblique	IRM -LRM	IOM -SRM
Inferior oblique	SRM - LRM	SOM -IRM

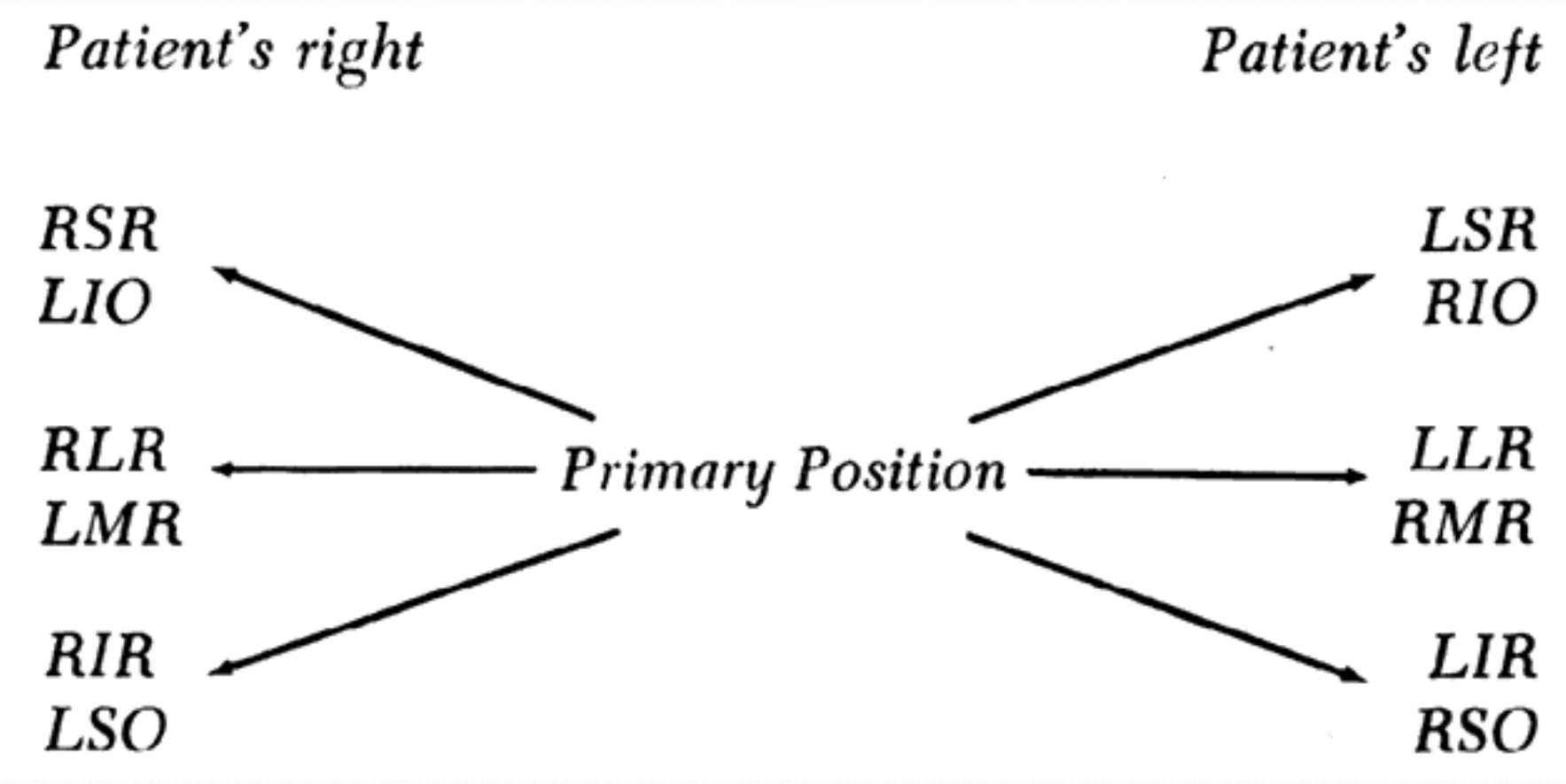
Sherrington's law:

Contractional power of Agonist muscles is equal to the relaxational power of Antagonist muscles.

Herring's law:

Equal innervations is induced to yoke muscles For each binocular movement.

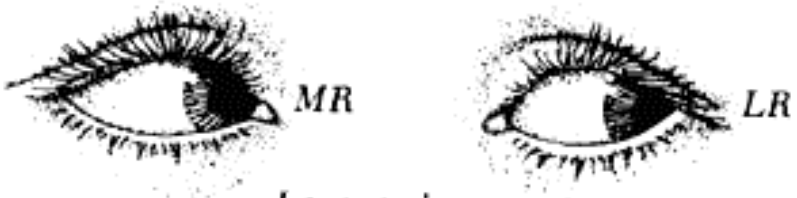
Hering 's law ,Yoke muscles



Versions

Dextroversion

Infraversion



Levoversion

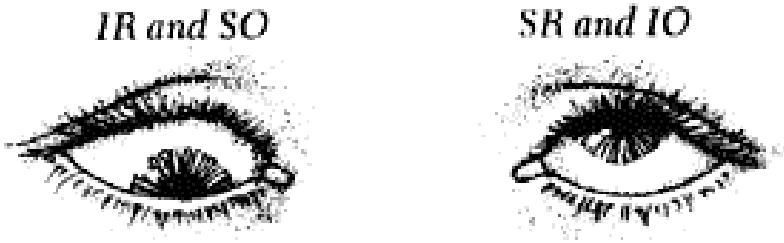
Dextrocycloversion

Supraversion

Levocycloversion

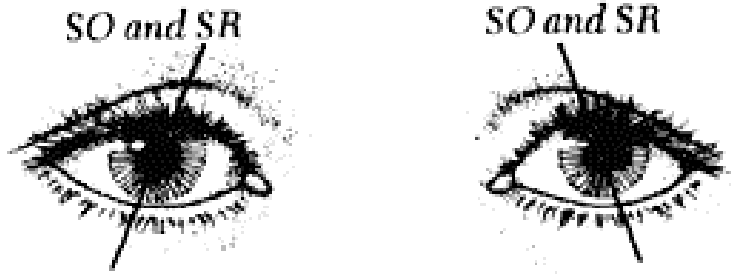
Vergence

Convergence



Negative vertical vergence

Divergence



Incyclovergence

Positive vertical vergence

Excyclovergence

History taking

- Age of onset of a deviation
- Did its onset coincide with trauma or illness
- Is the deviation constant or intermittent
- Is it present for distance ,near or both
- Is it unilateral or alternating
- Is the deviation associated with double vision

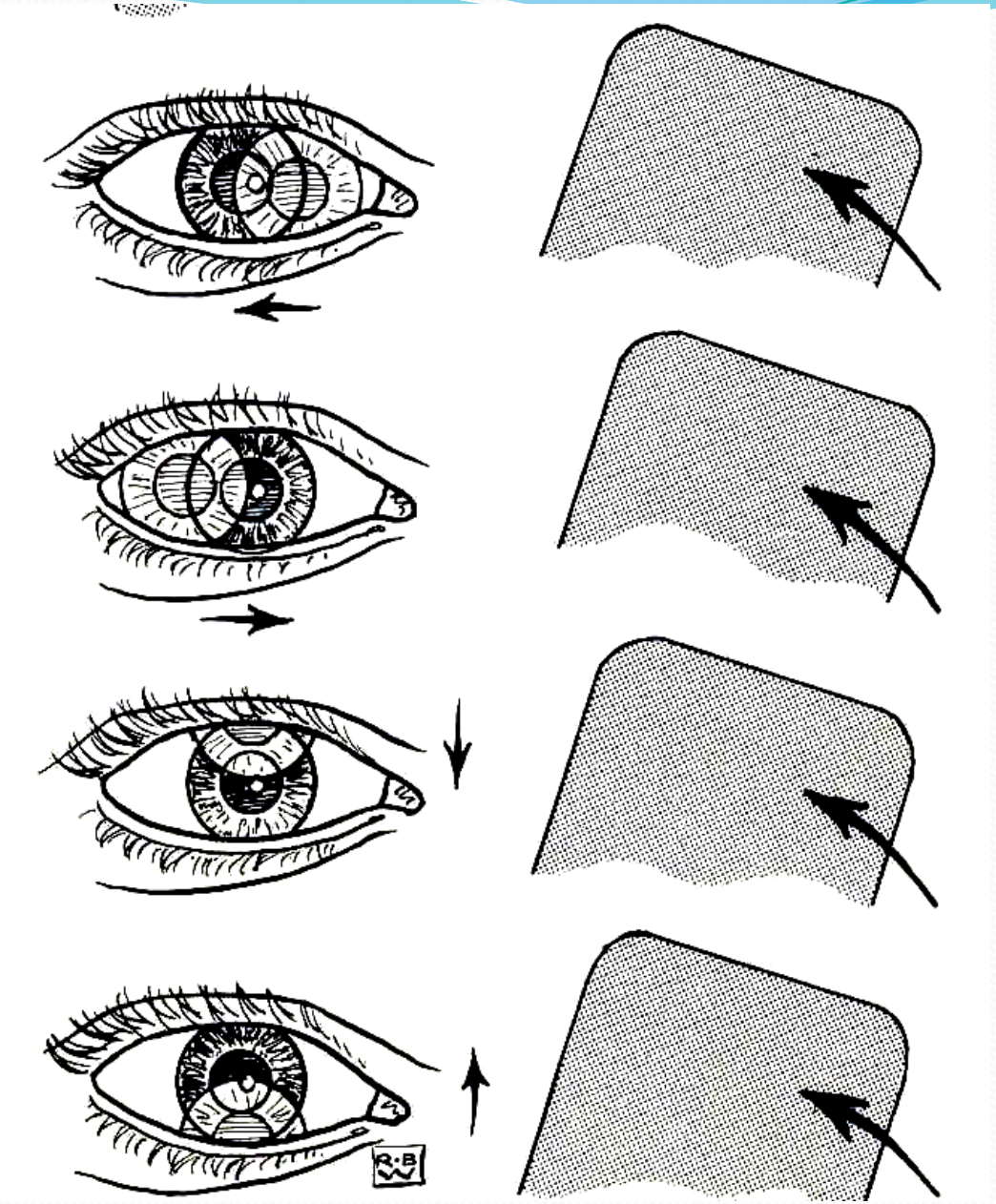
Con…

- Is it present only when the patient is inattentive or fatigued
- Does one eye have a tendency to close when the patient is outside in bright sunlight
- History of thyroid or neurologic disease
- Earlier treatment :
  - Amblyopia therapy, Spectacles ,Miotics, Orthoptic therapy , Prior eye muscle surgery

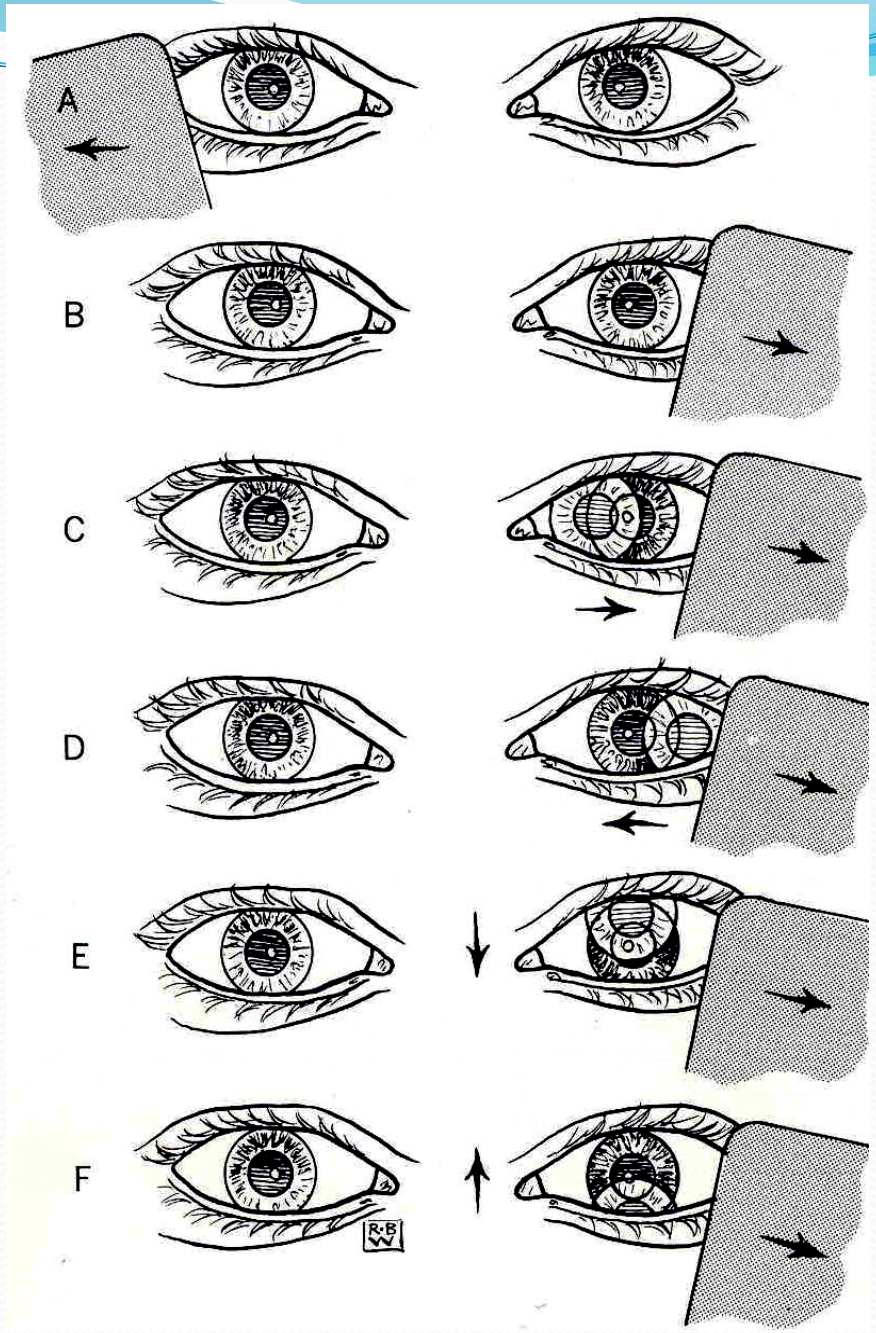
Physical exam

- Complete eye exam
- Best visual acuity ,far or near
  - E-chart – CSM methods
- Full cyclo-refraction
- Tests of ocular movement
- Tests of ocular alignments
  - Cover tests , corneal light reflex

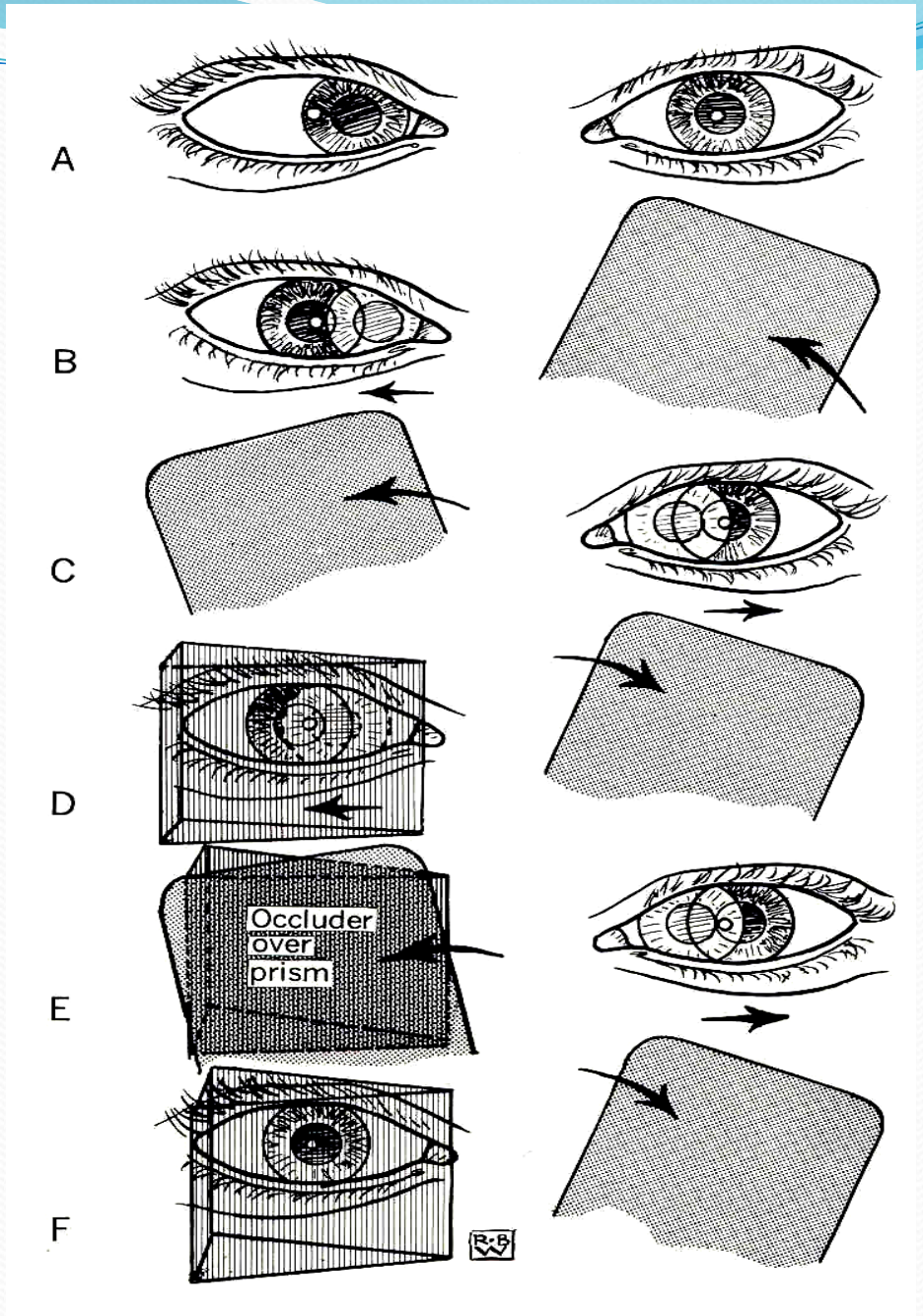
Monocular cover test



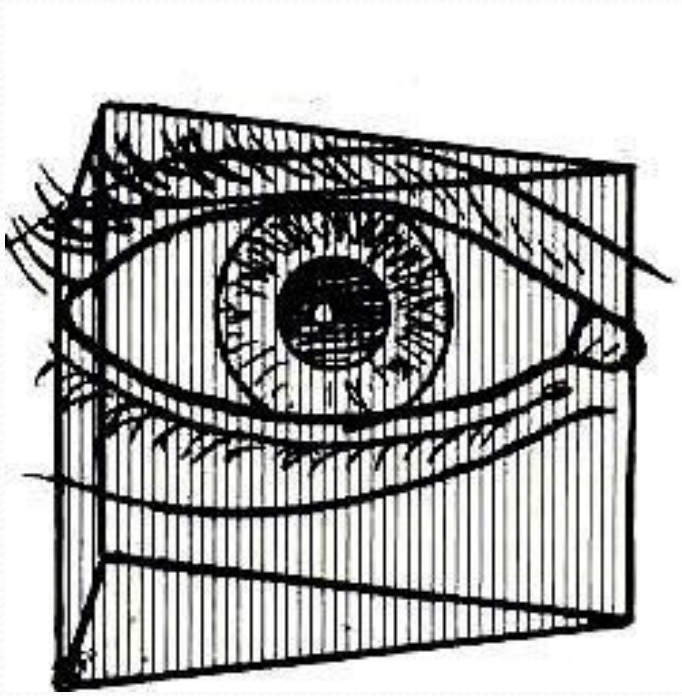
Alternate cover test

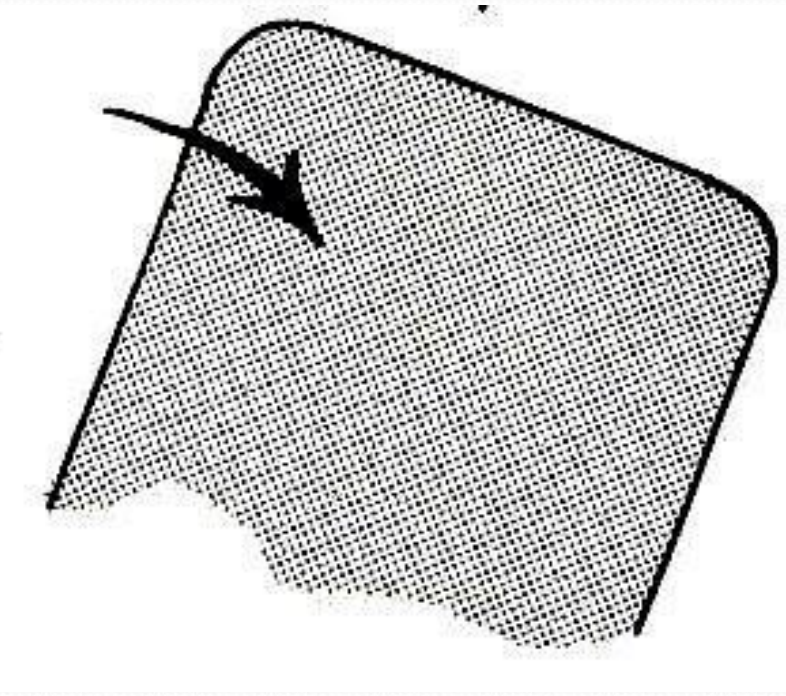


Alternate prism cover test

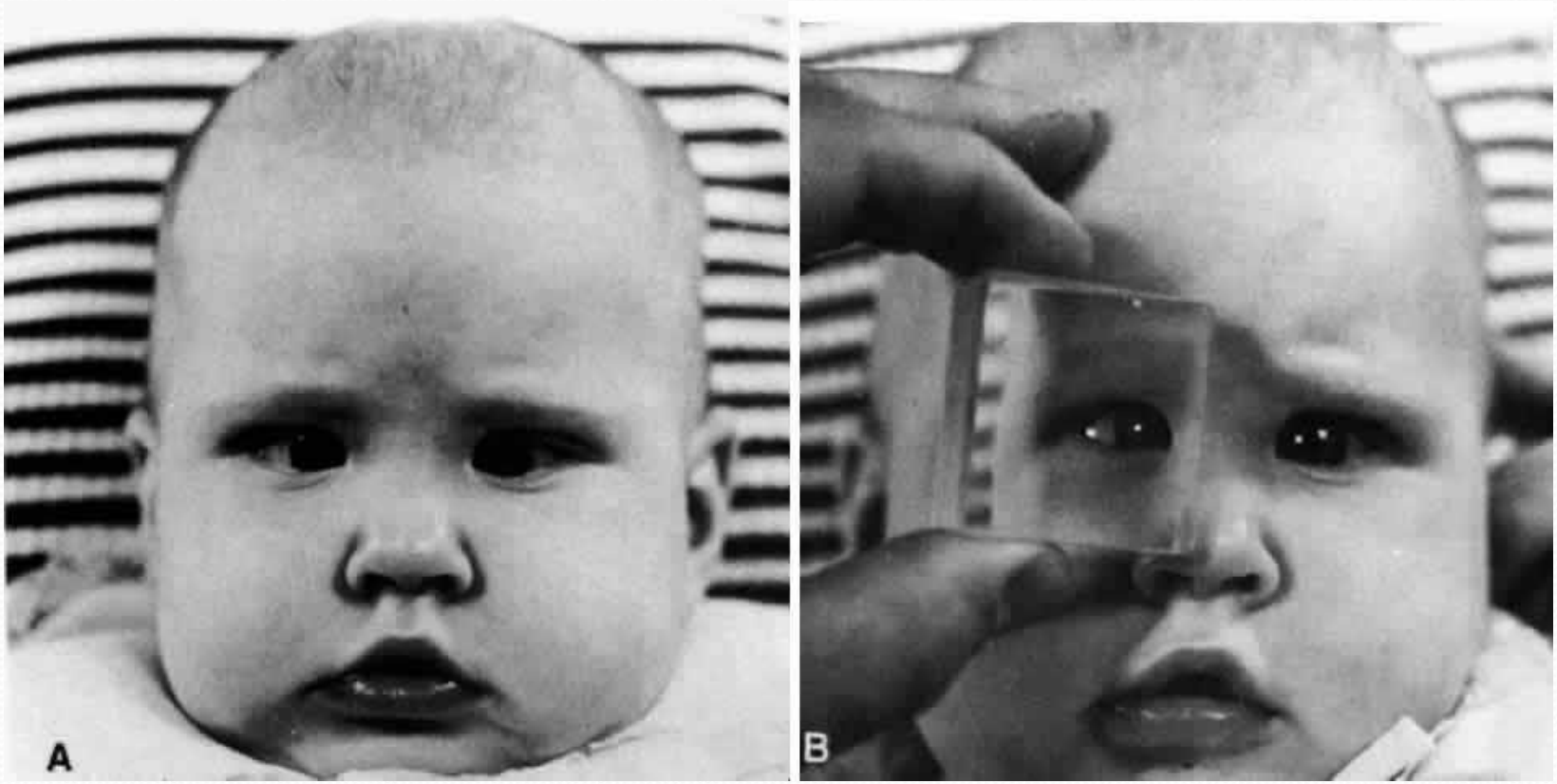


Simultaneous alternate prism cover test





Light reflex


A
B

Amblyopia

- Amblyopia is a unilateral or bilateral reduction of best corrected visual acuity

- Nearly all amblyopic visual loss is preventable or reversible with timely detection and appropriate intervention.

Amblyopia is caused by abnormal visual experience early in life

- Strabismus
- Refractive error
- Visual deprivation

Classification

- Strabismic amblyopia
  - Most common
- Anisometropic amblyopia
  - Unequal refractive error
- Isometropic amblyopia
- Deprivation amblyopia

Treatment

- Eliminating any obstacle of vision such as cataract
- Correcting refractive error
- Forcing use of the poorer eye by limiting use of the better eye

Acquired strabismus

- New onset eye deviation
- Ruled out neurologic problem
- Treatment
  - Management of underlying lesion
  - Relieving diplopia
  - Prevention of amblyopia
  - Surgery

Sixth nerve palsy

- Incomitant esodeviation
- Acquired palsy
  - Diplopia ,head turn
  - Intracranial lesion(1/3) ,infectious or immunologic process ,head trauma , increased ICP
  - Patching , prism , injection of Botox, surgery

Fourth nerve palsy

- Unilateral bilateral
- Congenital or acquired (closed head trauma , CNS vascular problem, DM, brain tumor)
- Hyperdeviation , head turn , extorsion
- Treatment : follow up,surgery

Third nerve palsy

- Children: Congenital(40-50%) , trauma , inflammatory ,neoplastic lesion..
- Adult: intracranial aneurysm, DM , trauma , infection , tumor
- Exodeviation ,hypodeviation , ptosis ,mydryasis
- Follow up, Surgery

Myasthenia gravis

- MG is a chronic disease of neuromuscular transmission
- Palsy of various extraocular muscles

  The easy fatigability of the muscle
- Any type of strabismus

- MG must be considered in any patient with acquired ptosis or diplopia.
- The muscles may be involved in only one eye
- Pupillary abnormalities are uncommon
- Characterized by remissions and exacerbations