



# NEET-PG

PART-C

VOLUME-II

## Ophthalmology and Pediatrics





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## ANATOMY

3 layers of Eyeball →

① OUTER MOST LAYER →

Ⓐ cornea → anterior  $\frac{1}{6}$ th

Ⓑ sclera → posterior  $\frac{5}{6}$ th.

Ⓒ Limbus → corneoscleral junction.

→ contains stem cells.



Pleuroipotent/Totipotent cell.

Q.1 → universal marker of stem cell



CD34

Q.2 → "

"

"

Limbal stem cell.



ABCG<sub>2</sub> protein<sup>cell</sup>

Q.3 → site of limbal stem cell →



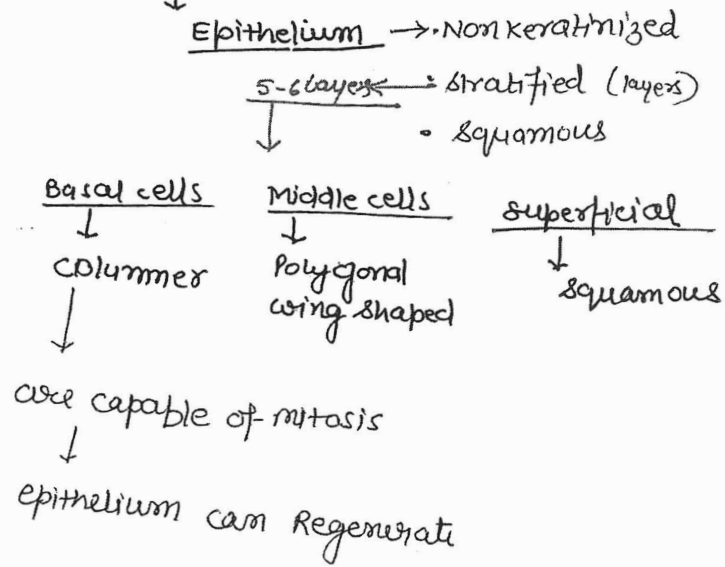
"Palisades of Vogt"

CORNEA →

• layers → 6

[Direction always ant to Post]

① Anterior most / outermost layer ↓



Q → finger nail injury → Epithelium injury → Regenerate

② Bowman's layer →

⇒ • A false Basement Membrane.  
↓  
PAS Negative.

⇒ Acellular → cant regenerate

⇒ Heals by scar formation (Heals by 2° Int)

↓  
leads to Permanent LOV (Loss of vision)

↓  
Rx - Keratoplasty (corneal tx)

corneal opacity → Most distortion of vision.

① Nebula → faintest, Iris details are visible.

② macula → Iris details Invisible, Iris visible

③ Leucomatous. → Iris Not visible.  
(most dense)

③ Stroma → • thickest layer.

• contains collagen → mc type → I

• Ground substance → mc keratin sulfate

④ DUA's layer → strongest layer

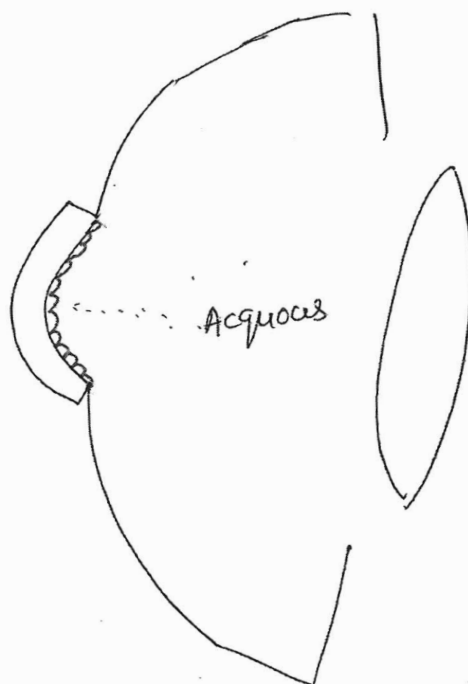
⑤ Desmets Membrane →

⑥ Posterior most / Innermost → Endothelium.

• metabolically most active.

• Helps to maintain corneal  
transparency.

↓  
 { by tight jxn  
 (zona occludens)  
 }  
 { B/w endothelial cells }

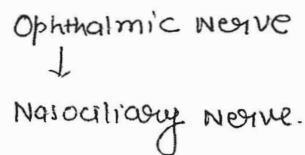


0.1 → ① endothelial cell → 2400 - 3000/mm<sup>2</sup>

0.2 → corneal hge or corneal  
decompensation → T cells < 500/mm<sup>2</sup>

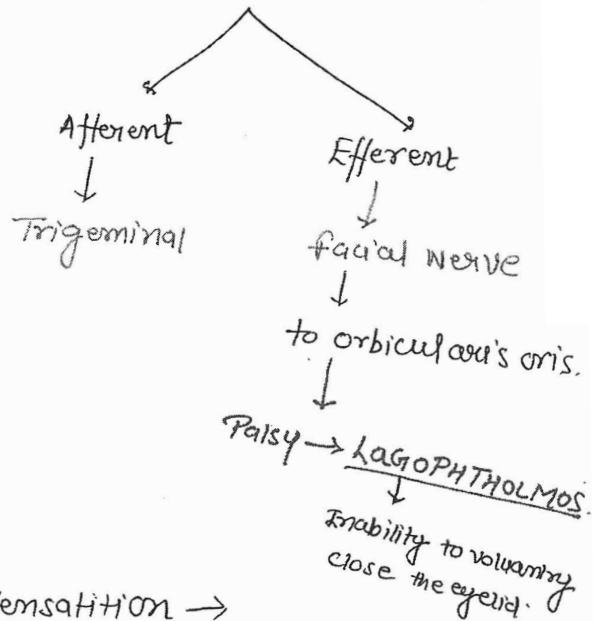
Q.3 → Inst to measure normal endothelial cell → specular Microscopy

• Nerve supply of cornea → Trigeminal nerve (5)



TON

Q. How to measure corneal sensation → Corneal blink Reflex



Q → causes of decrease corneal sensation →

H → Herpes ✓✓

D → Diabetes

L → Leprosy

Q. causes of thickened corneal nerve → becomes visible.

A → Acanthamoeba

K → Keratoconus

f → fuch's endothelial dystrophy

c → congenital glaucoma.



- L → leprosy
- M → MEN II A
- N → Neurofibromatosis.

⇒ Blood supply of cornea → Avascular (transparent)

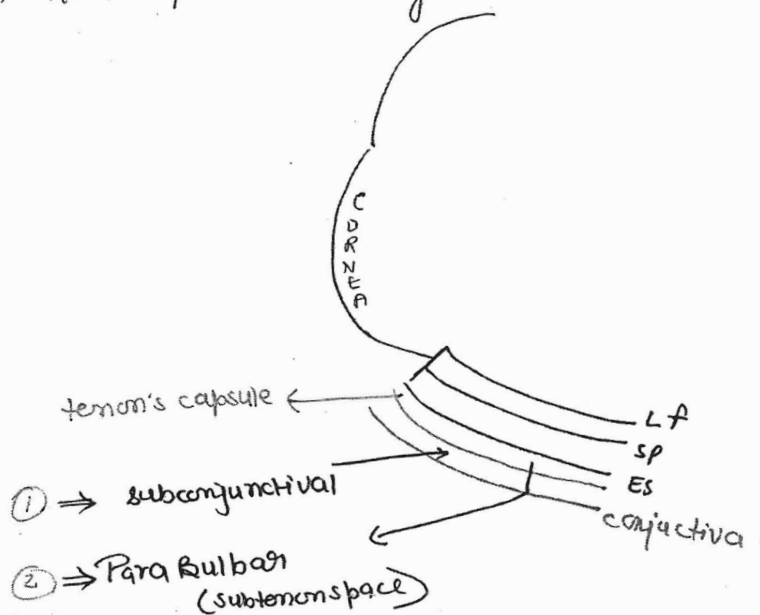
SCLERA :-

- 3 layers →
- ① Episclera
  - ② Sclera Proper
  - ③ lamina fusca (Innermost)

Q. Thickest <sup>nest</sup> sclera → Posterior to Insertion of Recti  
(0.3 mm)

Q. → Thickest sclera → Posterior around the optic nerve.  
(1mm)

Q. → Routes of ocular drug Administration →



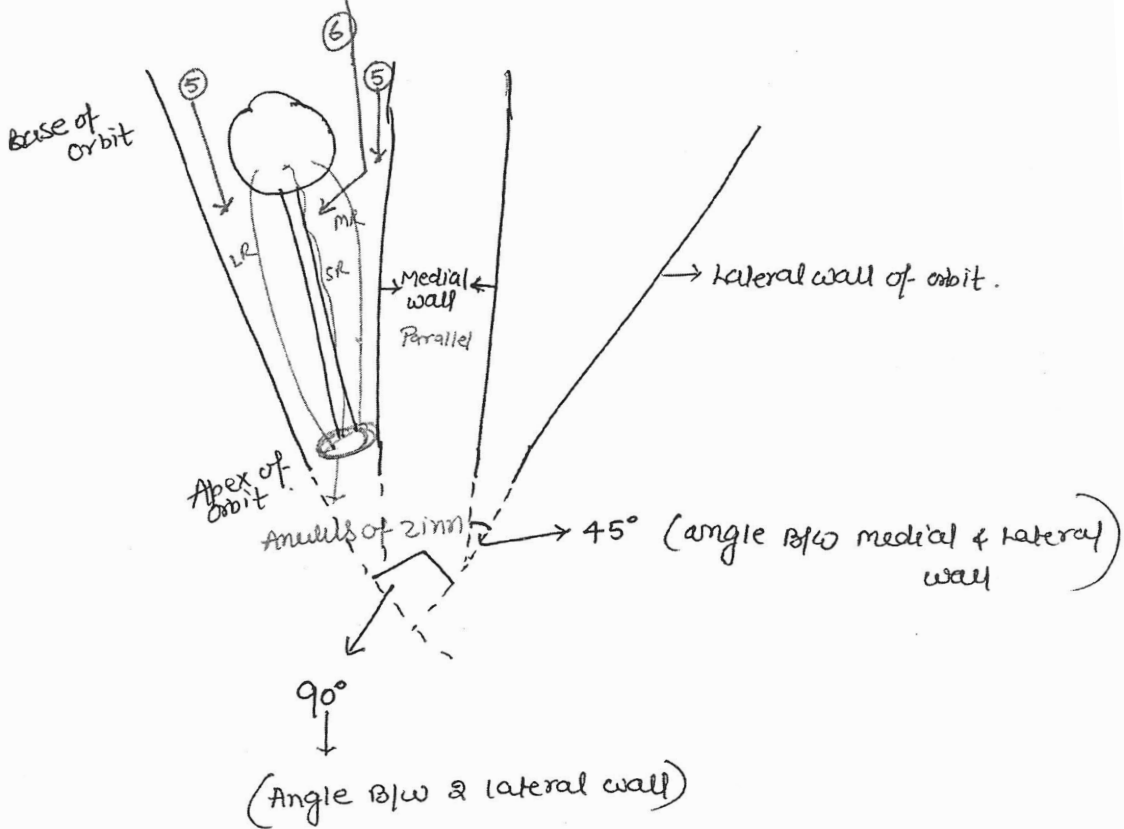
③ Intravitrous

④ Topical

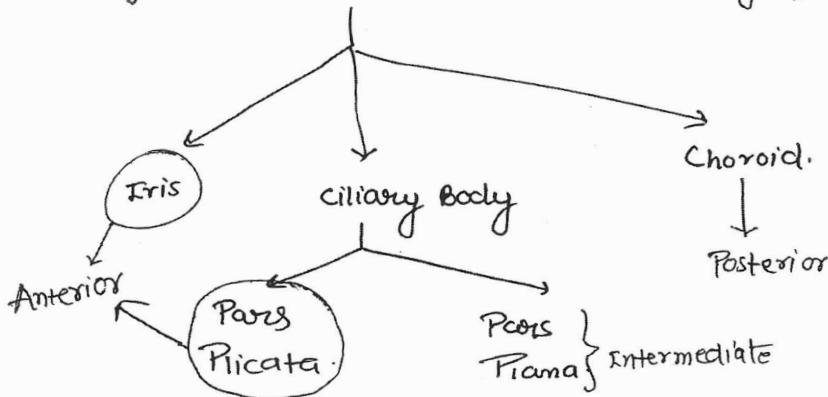
⑤ Peribulbar (Extracanal)

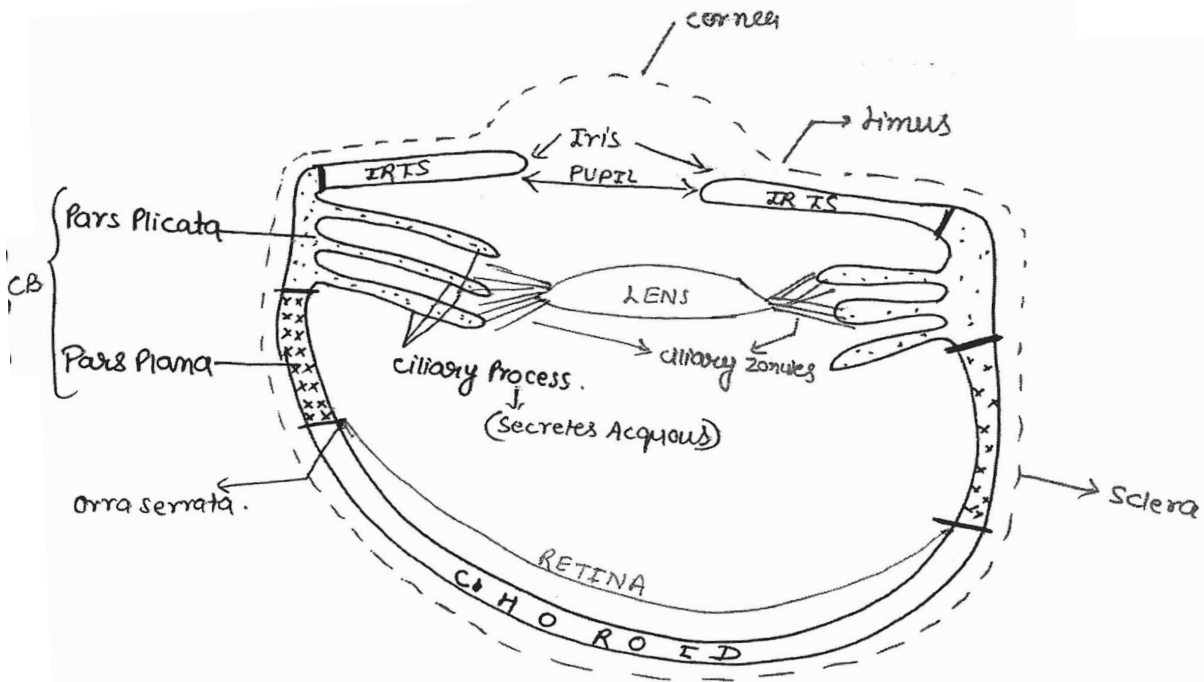
⑥ Retrobulbar (Intracanal)

→ given through both upper & lower eyelid.  
 } Anesthesia.  
 → given through the lower eyelid.



Middle layer → UVEA → (vascular layer)





IRIS :- 2 mys.

Sphincter pupillae

↓  
constriction of pupil

↓  
[MEIOSIS]

Nerve → Parasympathetic (3, 7, 9, 10)

↓  
[3]

↓  
Oculomotor Nerve

↓  
Inferior branch of Inferior Oblique.

↓  
SHORT ciliary NERVE

Dilator pupillae.

↓  
dilatation of pupil

↓  
[MYDRIASIS]

Nerve → Sympathetic

↓  
[C8-T1]

↓  
Cross anteriorly over lung  
lung parenchyma + ascend  
upwards to synapse in  
superior cervical ganglion

↓  
Long ciliary Nerve ascends  
upwards along with ICA to  
supply dilator pupillae.

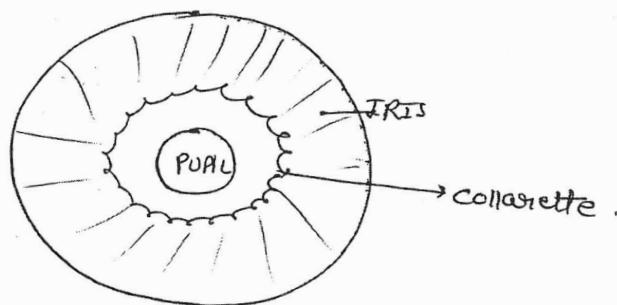
HORNER Syndrome →

- H → Heterochromia Iridis (different colour of Iris)
- I → Inferior eyelid elevation.
  - ↓ hypochromic (only for congenital cases)
- M → Miosis (X DP)
- A → Anhidrosis (X L) → loss of sweating
- P → Ptosis → X Muller m<sub>3</sub>
- L → loss of ciliospinal Reflex
- E → Enophthalmos (sunken eye ball)

test → 4% cocaine test [cocaine → Mydriasis]

Iris thinnest at → Root of Iris

Iris thickest at → COLLARETTE



CILIARY BODY →

& fxn

- ① secretion of Aqueous
- ② Accomodation.

Acomodation → for Near vision.

① Ciliary m<sub>s</sub> contracts

② All zonules relax

③ Ant. curvature ↑ → lens has more power

④ Post curvature Not change

⑤ AP diameter ↑



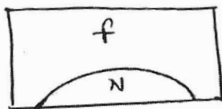
Anomolies of Acomodation →

① PRESBYOPIA; — Physiological insufficiency of Accomodation.

(around 40 years)

(loss of Near vision)

Rx



spectacles (convex lens)

Power → 45 yr → +1

50 yr → +1.5

55 yr → +2.0

60 yr → +2.5

② spasm of Acomodation →

[causes loss of far vision]



thus mimics myopia.



Pseudomyopia.

Innermost layer → RETINA  
(neural layer)

Gross Anatomy —

④ Optic Disc → point where optic nerve leaves the eyeball.

→ AKA → "Blind Spot"



No Rods + cones

⑥ MACULA → responsible for central vision.



center of macula — fovea



- contains max<sup>m</sup> cones
- most sensitive part of retina.

③ Ora serrata → Peripheral termination of retina anteriorly

- It can be considered at junction b/w ~~eye~~ choroid and pars plana.

Site of Intravitreal Injection →

- Same. {
- ① Anterior to ora serrata
  - ② Posterior to limbus
  - ③ By piercing sclera & pars plana.

⇒ Distance b/w limbus & ora serrata — 6mm

⇒ Best site of Intravitreal Injection → 3 mm posterior to limbus

↓  
In Aphakia cases

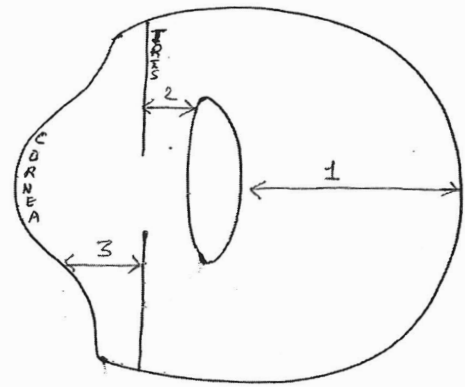
→ 3.5 mm posterior to limbus → Pseudophakia  
(IOL int)

→ 4 mm " " " " → Phakia cases  
(@crystalline lens)

Spaces of Eyeball →

Anterior segment (ant to lens) {  
     2 = Posterior chamber (Post to Iris)  
     3 = anterior chamber (ant to Iris)

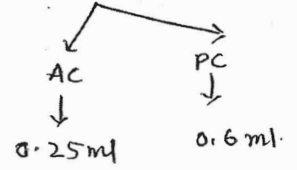
↓  
Contains  
Aqueous



1 = Posterior segment  
(Post to lens)  
↓  
contains VITREOUS

Aqueous

- Liquid.
- Volume → 0.31 ml.



Vitreous

- Gel → 1% Hyaluronic acid.
- Volume → 4 to 5 ml.

• Rate of Production  
 ↓  
 2.3  $\mu\text{l}/\text{min}$ .

• facility of acquish outflow  
 ↓  
 C-value  $\rightarrow 0.18$  to  $0.22 \mu\text{l}/\text{min}/\text{mmHg}$   
 ↓  
 Invt  $\rightarrow$  Tonography

fxn  $\rightarrow$

fxn  $\rightarrow$  Shock absorber.

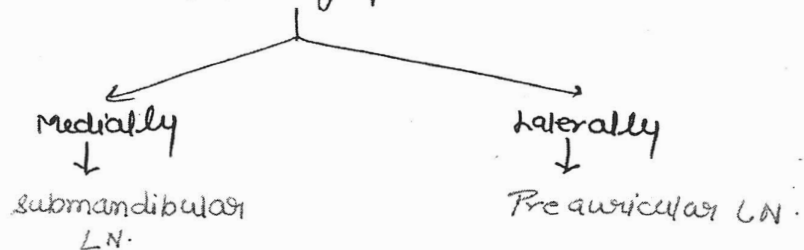
(a) Nutron to Cornea + lens

(b) Exerts IOP  
 ↓  
 (N) IOP  $\rightarrow 11$  to  $21 \text{ mmHg}$   
 ↓  
 Insvst  $\rightarrow$  Tonometry.

Lymphatic Drainage  $\rightarrow$   
 of eyeball.

Q.1  $\rightarrow$  <sup>L.D.</sup> Occurs from Conjunctiva.

Q.2  $\rightarrow$  occurs to which lymph Node.





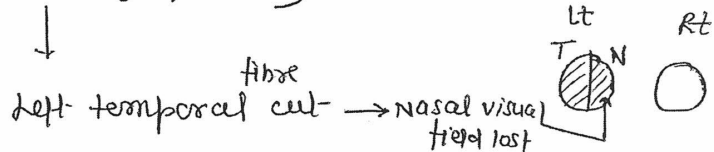
## - NEURO - Ophthalmology -

Visual pathway →

Note → 1 [visual fibres on Retina always opposite to visual field]

2 → TL temporal fibre → Not cross  
 NL Nasal fibre → crossed.

lesion No. 4 → Optic Nerve (left-side)



left Nasal fibre cut → temporal visual field lost.



[left Anopia] (TL)

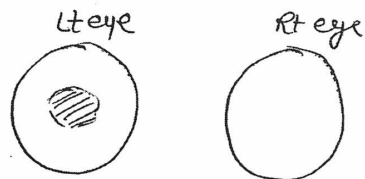
(a) earliest optic N lesion on left side →

earliest fibre lost



left macular fibre

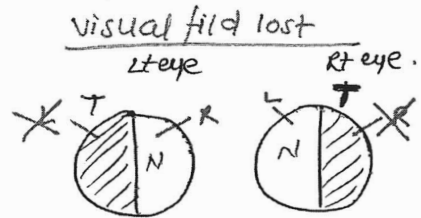
earliest visual field defect



left side central scotoma.

lesion No. 2 → optic chiasma. → only Binasal fibres cut (both eye)

fibres lost  
↓  
Binasal



→ Bitemporal hemianopia  
AKA

Heteronymous Temporal Hemianopia.

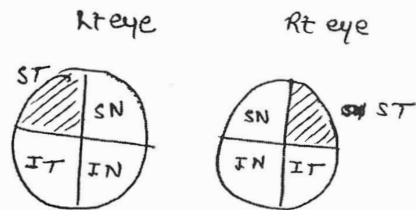
causes of Bitemporal hemianopia →

- ① inferiorly — Pituitary gland — Pit macroadenoma.
- ② superiorly → Rathke's Pouch → craniopharyngioma
- ③ laterally → cavernous sinus → cavernous sinus Thrombosis.
- ④ laterally 3<sup>rd</sup> ventricle → Glioma.
- ⑤ Artery → Anterior comm Arty aneurysm.

2a → earliest lesion by pituitary adenoma →

earliest fibres lost  
↓  
Inferior Binasal

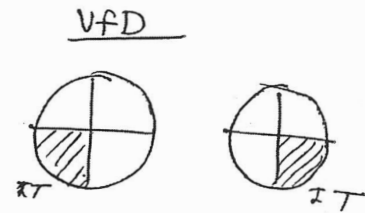
earliest VFD →



Bitemporal Superior  
Quadrantopia.

2b earliest lesion of craniopharyngioma.

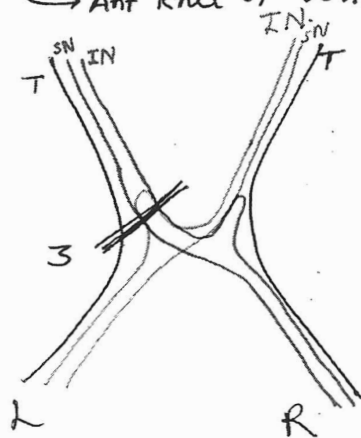
Earliest fibre lost  
↓  
Superior Binasal



Bitemporal inferior  
Quadrantopia.

lesion No. 3 →

- Proximal optic N
- or
- Jxn of ON & optic chiasma.
- Ant knld of von willebrand (proximal → near origin)



fibres lost

left temporal

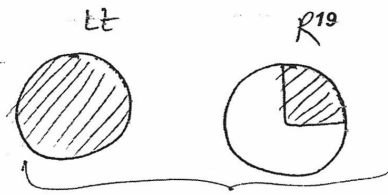
+

left Nasal

+

RE Infero Nasal

VFD



Junctional scotoma.



cause → Meningioma.

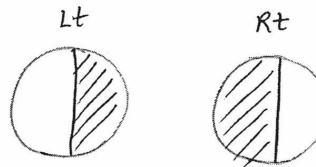
lesion NO 4 → lateral optic chiasma (B/L)

fibres lost



Bi temporal

VFD



Binasal Hemianopia.

lesion NO 5 → Optic tract

6 → LOB

7 → optic R.

10 → Visual cortex

↳ Never occurs clinically

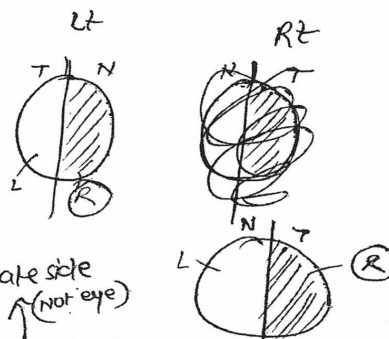
fibres lost

(left)

Left-(TL) temporal

Right-(NL) Nasal

VFD



[ Right (NL) Homonymous Hemianopia ]