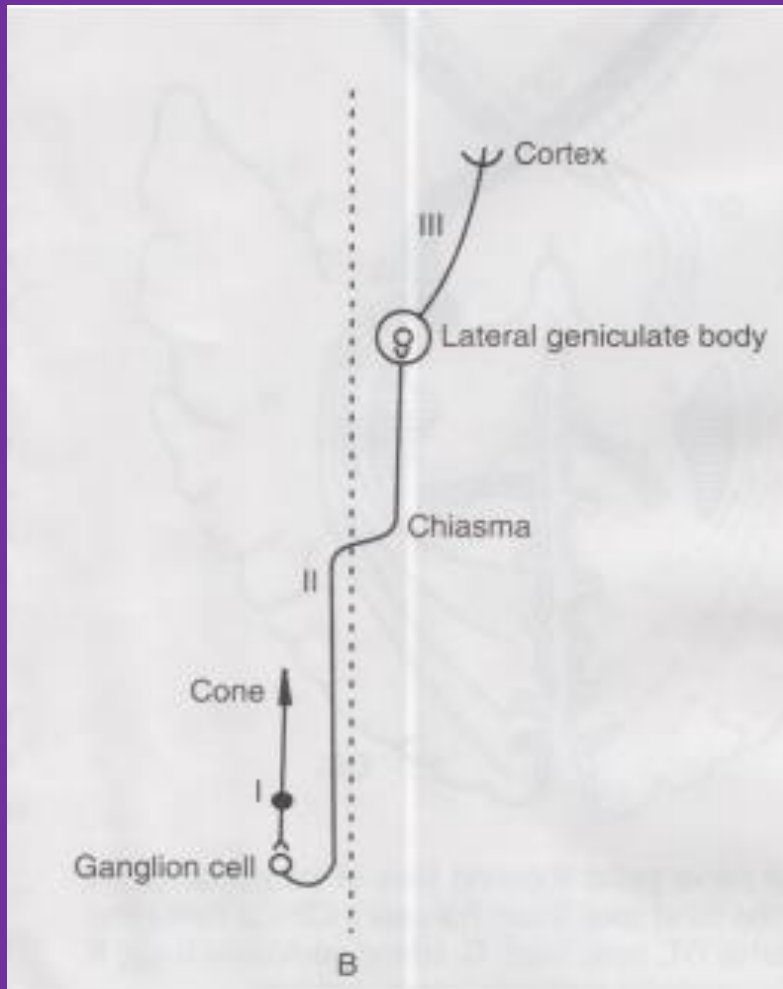


# Visual Pathway Lesions

Masoud Aghsaei Fard  
Farabi Eye Hospital,  
Tehran University of Medical science

# VISUAL PATHWAY ANATOMY



Visual sensations



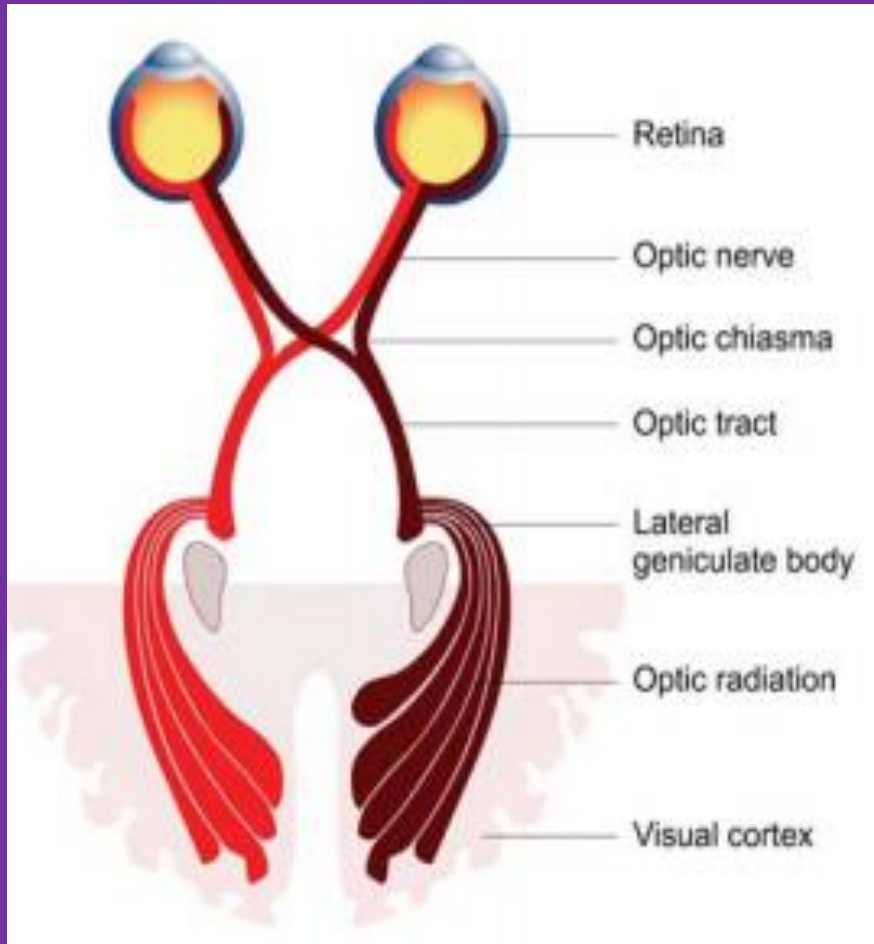
rods and cones



visual cortex

- *1<sup>st</sup> order neurons*
- *2<sup>nd</sup> order neurons*
- *3<sup>rd</sup> order neurons*

# COMPONENTS OF VISUAL PATHWAY



NEUROEPITHELIAL LAYER OF RETINA



OPTIC NERVE



OPTIC CHIASMA



OPTIC TRACT



LATERAL GENICULATE BODY

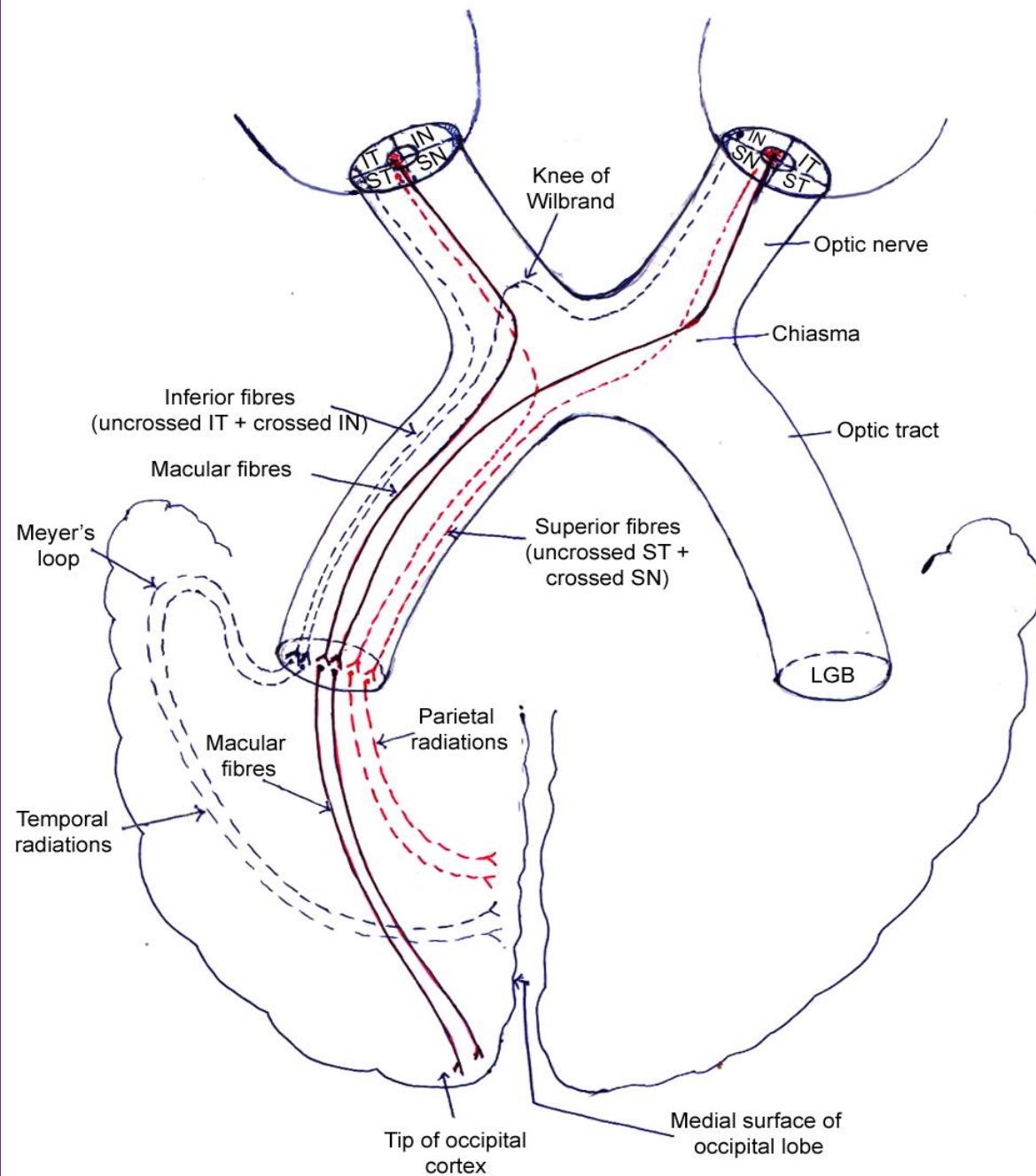


OPTIC RADIATION



OCCIPITAL CORTEX

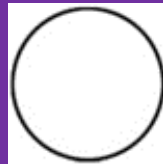
# VISUAL PATHWAY



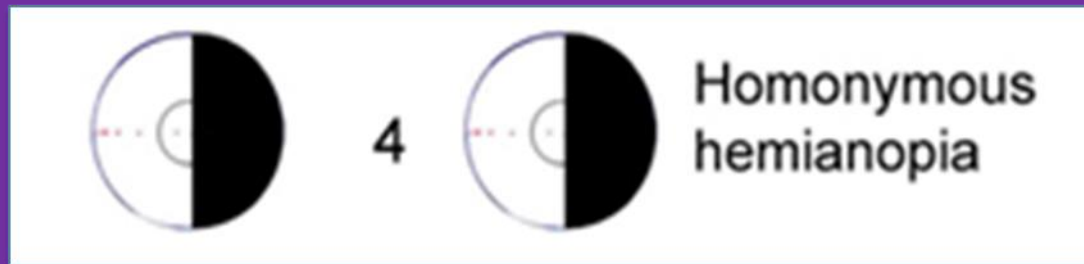
# Anopia

Loss of vision in one visual field

(Right anopia)



- **Hemianopia:** Loss of vision in one half of visual field



Heteronymous hemianopia

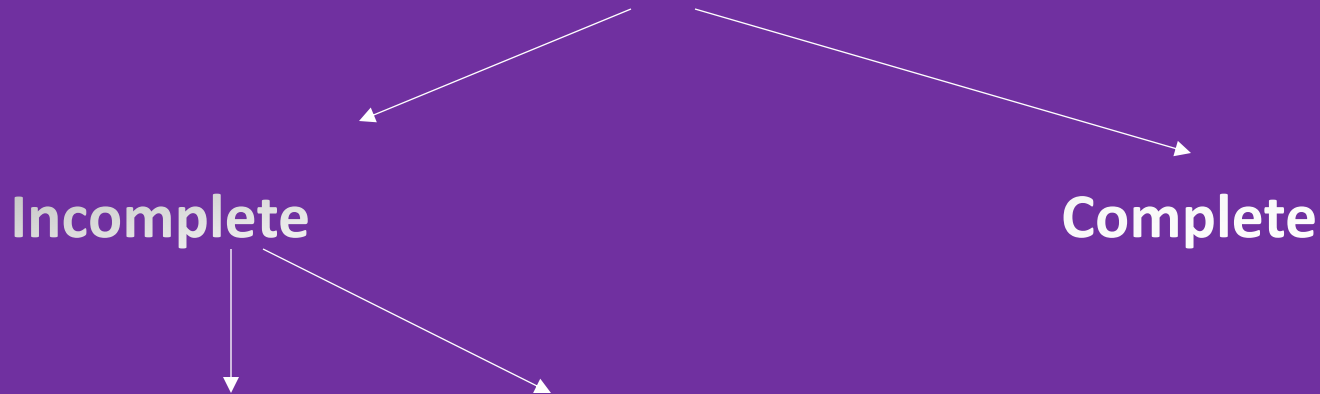
# Quadrantanopia

Loss of vision in a quadrant of visual field



Homonymous type

# Homonymous hemianopia



## Congruous

Defects are identical in size, shape, location, slope of margins  
eg-Post optic radiation lesions

## Incongruous

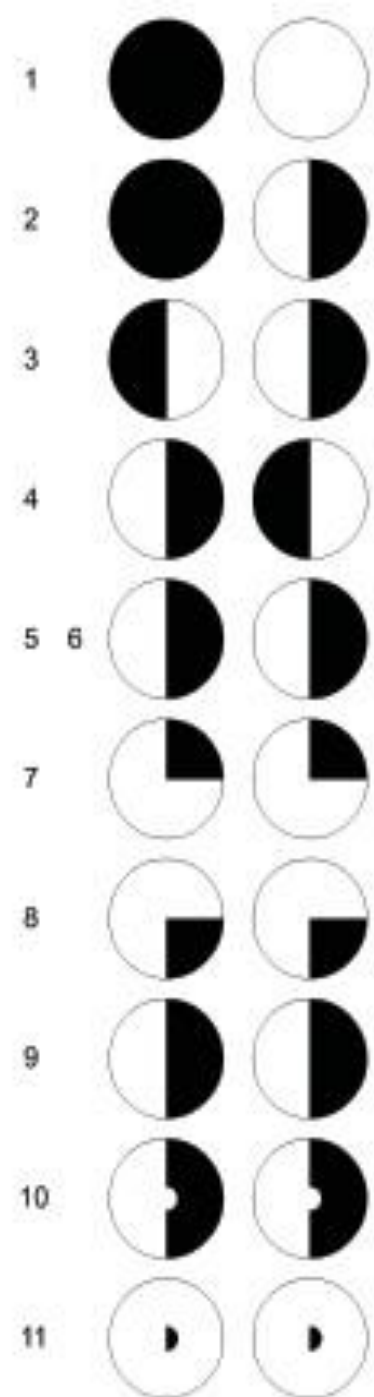
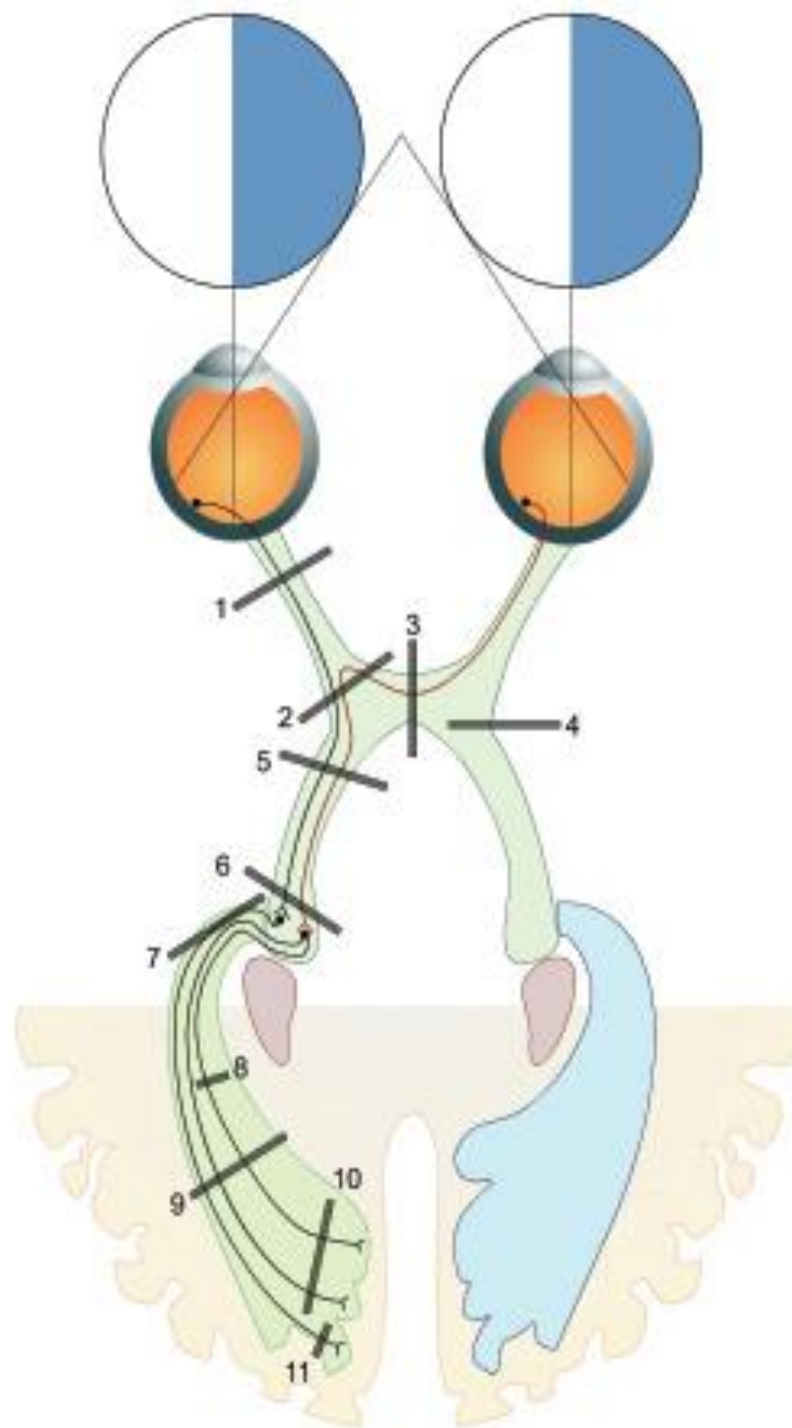
Defects are dissimilar  
eg-Optic tract & LGB lesions



Visual fields and retina have an **inverted** & **reversed** relationship

- Inferotemporal (**IT**) retina *projects superonasal field*
- Superotemporal (**ST**) retina *projects inferonasal field*
- Superonasal (**SN**) retina *projects inferotemporal field*
- Inferonasal (**IN**) retina *projects superotemporal field*

# LESIONS OF VISUAL PATHWAY



# Field Defects in Lesions of Optic Nerve

**Anopia-** loss of vision in full visual field

Right anopia

Left anopia



Loss of vision in  
right visual field



Loss of vision in  
left visual field



- Lesion of proximal (posterior) part of optic nerve near chiasma



**Cause:**

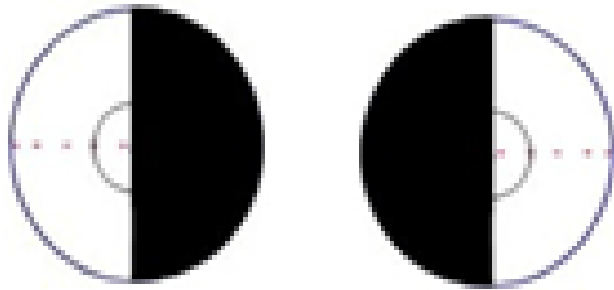
traumatic avulsion or optic atrophy

**Clinical features:**

- Ipsilateral anopia  
(loss of vision)
- Loss of direct pupillary reaction  
(same side)
- loss of consensual pupillary  
reaction  
(other side)
- Near or accommodation reflex is  
present

# Field Defects in Lesions of Optic Chiasma

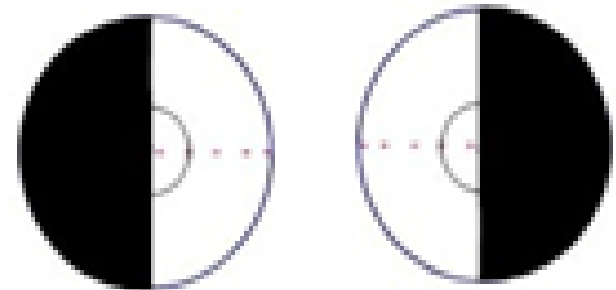
## Binasal hemianopia



(Less common)

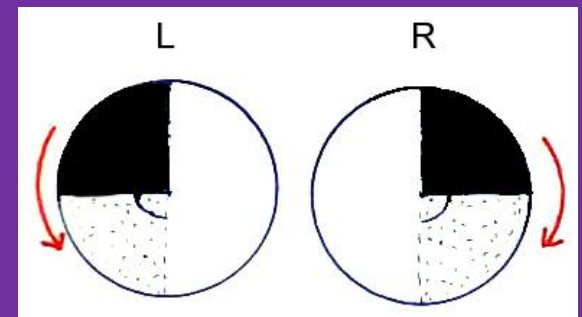
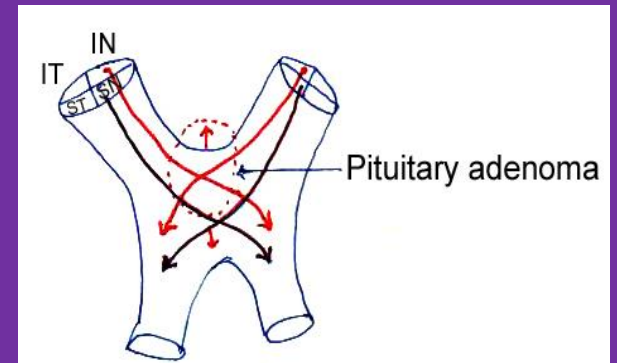
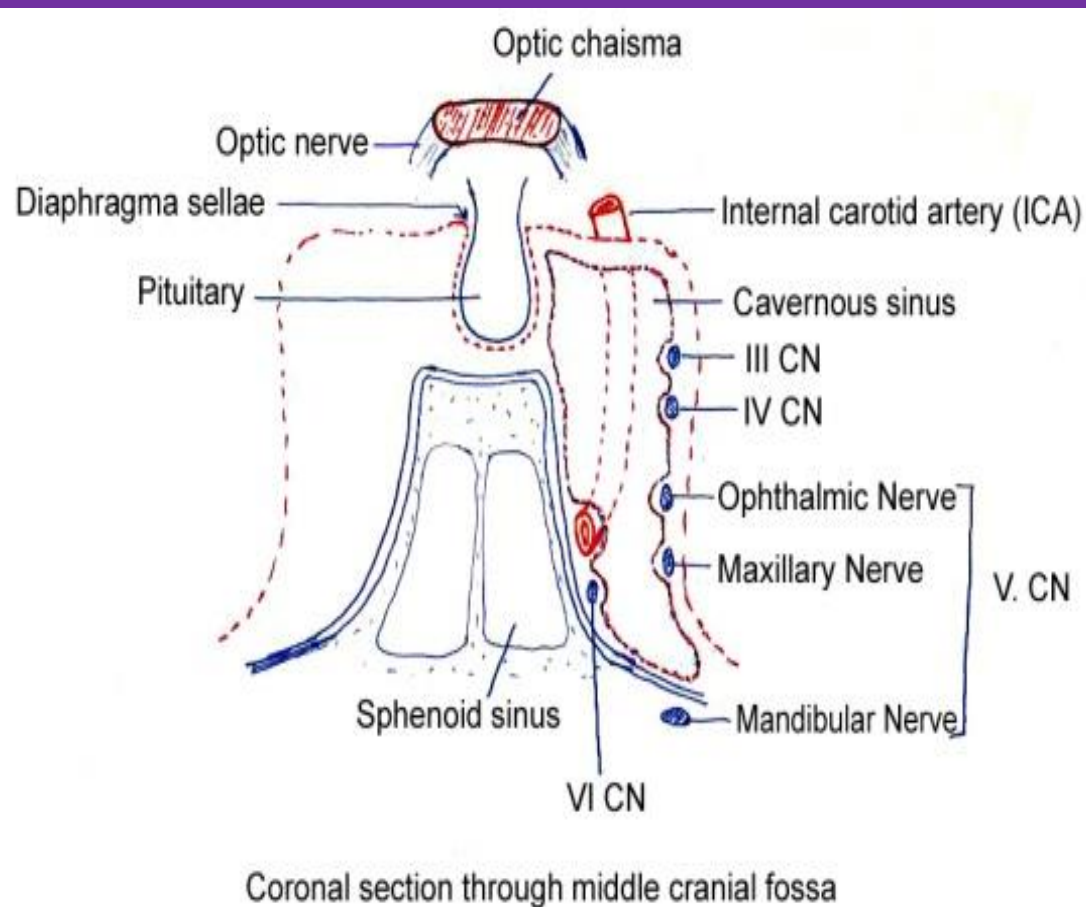
- IIIrd ventricle enlargement / dilatation
- Atheroma of carotids or posterior communicating arteries

## Bitemporal hemianopia

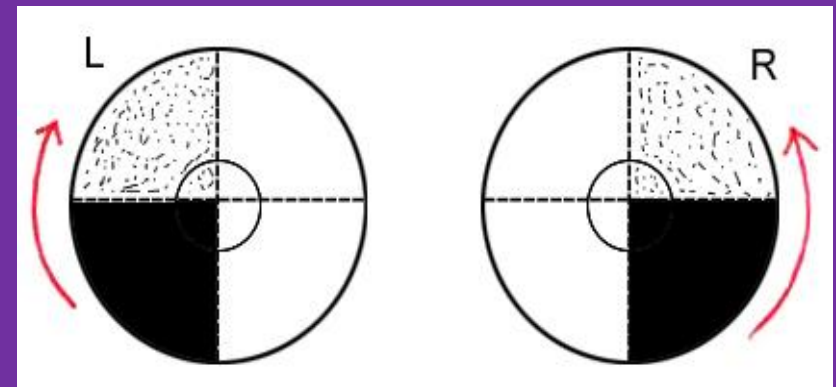
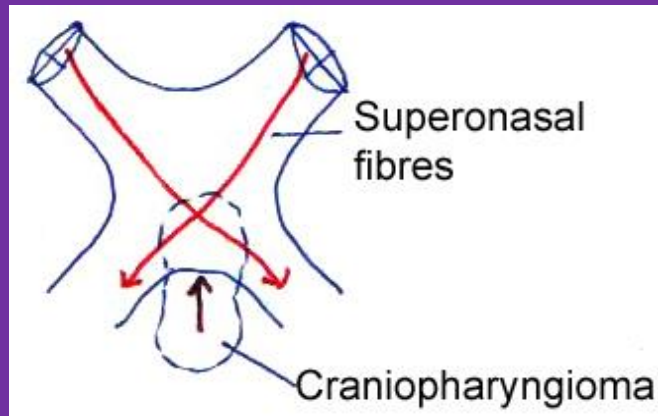


- Pituitary adenoma or malignancy
- Craniopharyngioma
- Chronic chiasmal arachnoiditis
- Fracture of the base of skull

# Pituitary Adenoma



# Craniopharyngioma

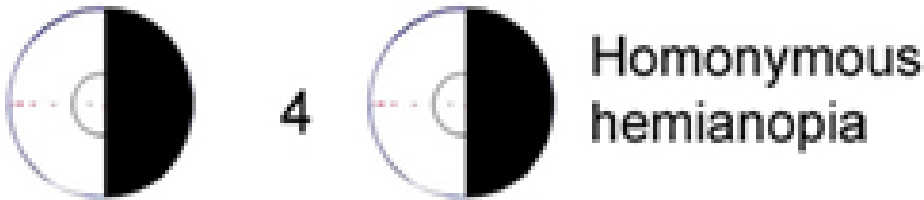


# Field Defects in Lesions of Optic Tract

➤ Left optic tract lesion due to involvement of left cerebra, leads to Right homonymous hemianopia

➤ Afferent pupillary conduction defect present

➤ *Association with right hemiplegia and left 3<sup>rd</sup> nerve paralysis indicates a left optic tract lesion involving left cerebral peduncle and left 3<sup>rd</sup> nerve.*



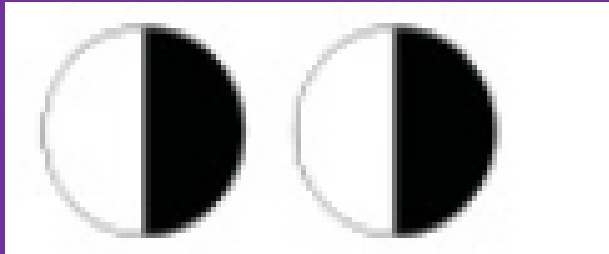
## *Causes of optic tract lesion*

- Syphilitic meningitis
- Tuberculous meningitis
- Tentorial meningioma
- Temporal lobe glioma
- Aneurysm of superior cerebellar or posterior cerebral arteries.



# Field Defects in Lesions of Lateral geniculate Body (LGB)

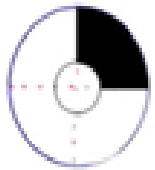
*(These are extremely rare)*



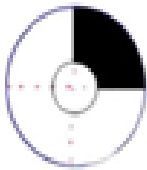
- The lesions of LGB produce incongruous homonymous hemianopia with sparing of pupillary reflexes

# Lesion of optic radiations

Anterior temporal lobe



5



Superior  
quadrantanopia

Pie in the sky

Parietal lobe



6



Inferior  
quadrantanopia

Pie on the floor

Posterior part of  
Internal capsule (Ant  
occipital cortex)



7



Homonymous  
hemianopia with  
sparing of macula

# Common causes of lesions of optic radiations

- Vascular occlusions
- Cerebral tumours
- Injury by fall on the back of head

# lesions of optic radiations-Clinical presentation

- Do not produce optic atrophy(3<sup>rd</sup> order neurons)
- Congruous
- Pupillary reactions are normal

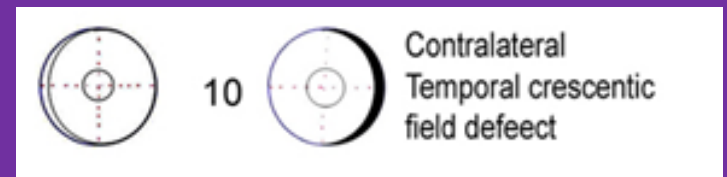
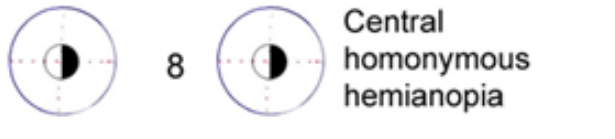
# Field Defects in Lesions of Visual Cortex

## • LESIONS IN VISUAL CORTEX

TIP OF OCCIPITAL  
CORTEX

ANTERIOR VISUAL  
CORTEX

ANTERIOR MOST PART  
OF VISUAL CORTEX



# Common causes of lesions of Visual Cortex

- Vascular lesions in territory of PCA
- Trauma- fall on the back of head or gunshot injury
- Cerebral Tumours- Primary or metastatic.

# Clinical presentation in Visual Cortex Lesions (Cortical blindness)

- Denial of blindness [Anton syndrome]
- Appreciation of motion in the blind field  
[Riddoch phenomenon]
- Word blindness [Alexia] if left angular gyrus is involved

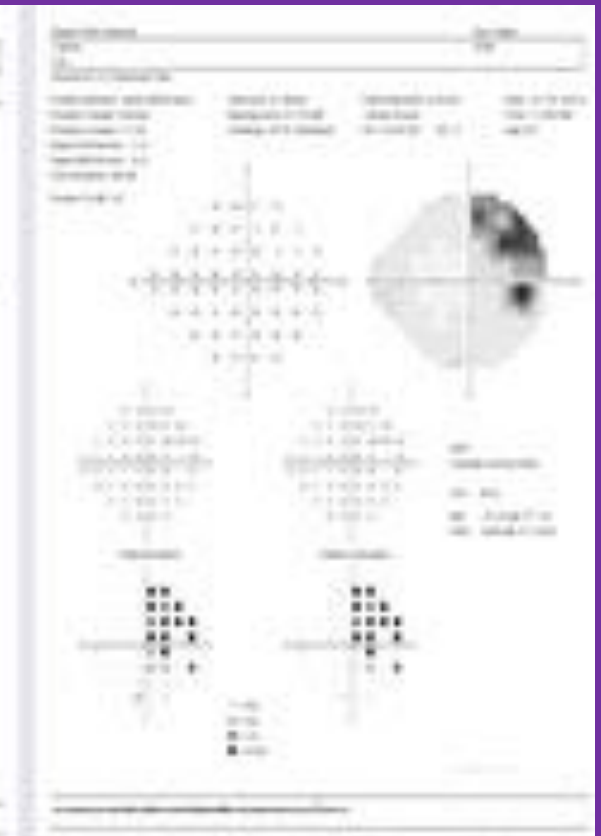
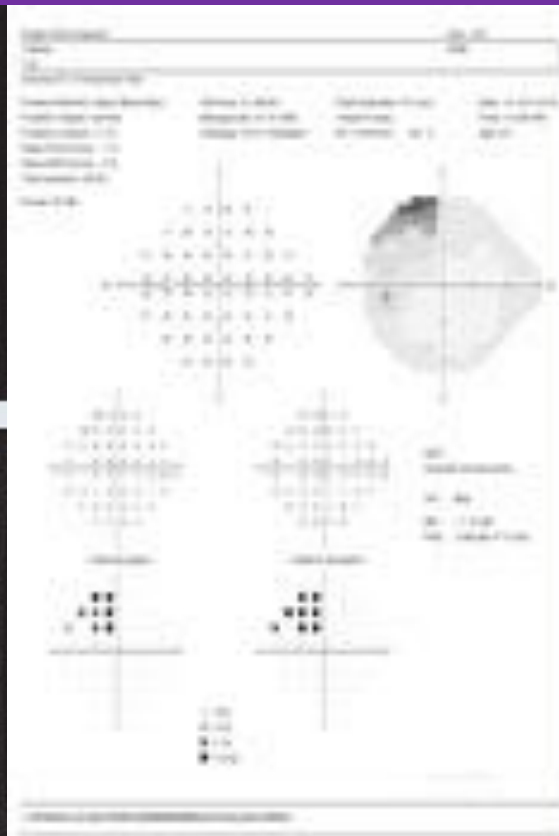
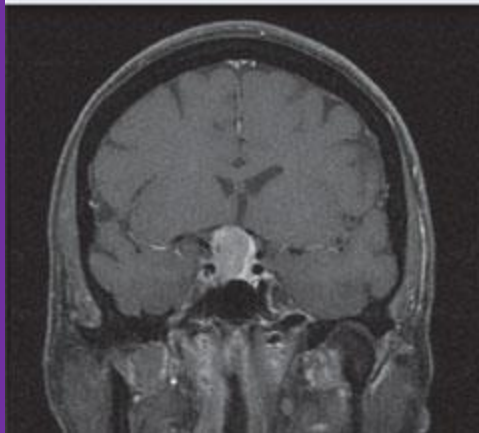
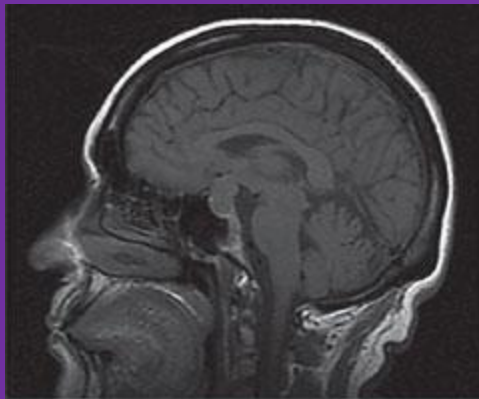
*It is therefore mandatory to examine reading ability in context of a right hemianopia*

*(i.e. in left occipital lesion).*

# Differences between occipital lobe and optic tract lesions

	Clinical Features	Occipital lobe lesion	Optic tract lesion
	Pupillary reaction	Normal	Abnormal
	Field defect	Congruous	Incongruous
	Macular involvement	Sparing	Involved
	Optic atrophy	-	+









Thank  
you