NORMAL AND ABNORMAL VISUAL PATHWAYS

TERMINOLOGY

VISUAL FIELDS

Left
NASAL VISUAL FIELD
Nose
TEMPORAL VISUAL FIELD

Right
TEMPORAL RETINA

NASAL RETINA
VISUAL PATHWAYS

Left half of vision goes to
1. Nasal retina of left eye (these fibres then cross at the chiasma)
2. Temporal retina of right eye (these fibres do not cross).

Therefore all left vision ends up on the right side of the brain.

VISUAL PATHWAYS

Right half of vision goes to
1. Nasal retina of right eye (these fibres then cross at the chiasma)
2. Temporal retina of left eye (these fibres do not cross).

Therefore all right vision ends up on the left side of the brain.
VISUAL PATHWAYS

All fibres, whether or not they cross at the chiasma, pass in their respective optic tracts and synapse in the lateral geniculate bodies.

G = Lateral geniculate body in thalamus

VISUAL PATHWAYS

From the lateral geniculate bodies fibres pass in the optic radiations to the left and right occipital cortex.

G = Lateral geniculate body in thalamus

Note that all images arrive in the occipital cortex inverted (upside down)
VISUAL PATHWAYS

Fibres from the optic tracts on each side synapse with each of the Edinger Westphal nuclei so that all reflexes are bilateral.

To initiate rapid reflexes at brain stem level, the incoming fibres from the eye must connect to the mid brain which lies near the optic tracts.

G= Lateral geniculate body

VISUAL PATHWAYS

Parasympathetics from the Edinger Westphal nuclei synapse in the ciliary ganglia and then supply the sphincter pupillae muscles for constricting the pupils.

G= Lateral geniculate body
LESION 1: **OPTIC NERVE**
Complete destruction of the left optic nerve gives **blindness** in the left eye.

**VISUAL DEFECTS**

LESION 2: **OPTIC CHIASMA**
Complete destruction of all the crossing fibres leads to blindness of both temporal visual fields. This is a **BITEMPORAL HEMIANOPIA**.

**VISUAL DEFECTS**
LESION 3: OPTIC TRACT
Complete destruction of all fibres in the left optic tract leads to blindness of both right visual fields. This is a RIGHT HOMONYMOUS HEMIANOPIA.

LESION 4: OPTIC RADIATION
Selective destruction of fibres in the left optic radiation leads to variations on the theme of a RIGHT HOMONYMOUS HEMIANOPIA that may be loss of a quadrant. For example:
"A CENTRAL FIELD LOSS IS ALWAYS CAUSED BY A PROBLEM IN THE EYE" (E.G. GLAUCOMA OR DETACHED RETINA)

"A UNILATERAL COMPLETE FIELD LOSS IS ALWAYS CAUSED BY A PROBLEM IN THE EYE OR IN THE OPTIC NERVE"