Why Do My Fields Look Like That?

Whether you are doing HVF or GVF, finding the defect for the problem can be a confusing and often scary endeavor.

How do you find the problem? Better yet - what is the problem you are looking for?? Do you need to know what you will find before you find it ?!

You need a plan before you begin!

IF you know a few "tricks"...you will not get lost doing either HVF's or GVF's.

It's not crystal ball time... it's knowing the cheats 😊

In the movie "Maverick", Jodie Foster plays Annabelle Bransford... a card shark that had a very distinct "tell". A "tell" is a bad habit poker players do that inadvertently tips off other players to the type of hand she has. It is a "cheat" for her fellow card players.

Her "tell" was she would play with her ear lobe when she had a good hand. And Maverick would use that against her! We can do the same thing with visual fields. With a little info (cheats) we can "predict" the field before we even start!

How?

The visual pathway has (3) parts:
* Prechiasm
* Chiasm
* Postchiasm

Each part of the pathway "does something" consistently...so...
Cheat # 1:
Where is the Problem?
For example:
Dry Macular Degeneration.
There will be a Macula scar. The macula is part of the retina. The retina is in the eye. When the problem is in the eye... we will in most cases have a scotoma in the place where the problem is (the Macula).
Macula = Fixation.

Answer:
Central Scotoma

Cheat # 2:
Certain Words Almost Always Lead You To Where the Problem is Located In The Pathway and Therefore What The Field Defect Should Be!

Words?
Pituitary: a. think temporal b. think bitemporal hemianopsia

Papilledema:
a. think enlarged blind spot b. think increased intracranial pressure

Visual Pathway:
- Prechiasm
- Chiasm
- Postchiasm

Nerve fibers from each eye cross at the optic chiasm to the opposite side of the brain. So... light in the right (temporal) visual field of the right eye is seen by the nasal retina of the right eye and nerves carrying these impulses cross at the chiasm to the left side of the brain!
Prechiasm: "Optic Nerve to Air"

Everything in the eye all the way back to and including the nerve.
- cornea
- lens
- vitreous
- retina
- optic nerve

Problems with the System

1. Abnormal vision
2. Abnormal color vision
3. Abnormal pupils

Characteristics

A. Monocular
   \textbf{UNLESS} both eyes involved independently
B. Respects the horizontal (only with nasal steps)
C. Scotomas and Depressions
D. Decreased vision
E. Abnormal pupils
F. Abnormal color vision

Visual Field Defects That Occur

A. Scotomas
   - central
   - paracentral (within 20 degrees of fixation)
   - Bjerrum or arcuate: respects the horizontal
   - centrocecal

B. Nasal Steps
   When a bundle of nerve fibers that enter the bottom of the optic disc is damaged in glaucoma, an arcuate scotoma occurs in the upper nasal visual field. Occurs sharply at the horizontal raphe.
Glaucoma

Glaucoma is a triad disease processes:
* optic nerve changes
* visual field changes
* higher than normal pressures
  (10 – 20 Hg mm)

What Are We Looking For?

Central & Paracentral Scotomas
Enlarged Blind Spot
Nasal Steps

Red Filter Tests

1. Optic Neuritis
   Inflammatory neuropathy due to a number of reasons but most commonly from demyelinating disease – including MS.
   Retrolubar neuritis occurs behind the disk so that the disk remains “normal” in appearance.
   "The patient sees nothing and the doctor sees nothing"

Signs and Symptoms

* Mainly women (3:1)
* Onset 3rd or 4th decade
* Associated with MS in 85% of cases
* Vision loss is usually at the 20/40 level for first attack
* Decreased color vision
* 90% have pain near eye with 50% having pain on movement
* Vision will improve – but will eventually relapse due to CNS demyelinating disorder
**Chiasm**

That place in the brain where binocular vision first occurs.

* Most common defect: bitemporal hemianopsia
* Most common problem: pituitary tumor

**Characteristics**

In most cases:
* vision is normal
* pupils are normal
* color vision is normal
* respects the vertical
* defects in the temporal area

**Bitemporal Hemianopsia**

*Classic Field Defect*

Pituitary tumor is pushing **DOWN** and **UP** on the chiasm.

**What The Patient Sees**

**Binasal Hemianopsia**

Tumor is pushing on the chiasm from the sides. This can be caused by sclerotic internal coronary arteries.

**What The Patient Sees**
**Junctional Scotoma**

When you have a "blind" eye (dense central scotoma), check the superior temporal side of the fellow eye!

I classify "blind" as anything worse than 20/80 due to a central scotoma.

**Postchiasm**

Postchiasm is 2/3rds of the visual system.

Consists of the following:
- Optic Tract
- Lateral Geniculate Bodies
- Optic Radiations
- Occipital Lobe

"Occipital is identical"

**Characteristics of Postchiasm**

A. Defects OU
B. Respect the vertical
C. Further back into the system, the more alike (congruous)
D. Vision is normal
E. Pupils are normal
F. Fundus normal ... Brain tumor may cause papilledema or pale disc

**Problems with the System**

A. Stroke
   - Cerebrovascular Infarct
B. Tumor
C. Trauma
   - Subarachnoid hemorrhage

**Phrases We Can Use**

- **Congruous** = symmetrical
  - look like carbon copies
- **Incongruous** = asymmetrical
Homonymous = same side affected in each field

Heteronymous = opposite side affected in each field

The more anterior you are in the postchiasm system (i.e. closer to the chiasm side) the less congruous the fields are. The more posterior you are in the postchiasm the more alike the fields are to a point that when you at the occipitals - they are identical!

Macula Sparing

- The hemianopsia will avoid fixation
- Indicates the lesion or injury is more posterior in the postchiasm system

Macular Splitting

- Hemianopsia is rigidly adherent to the vertical meridian
- Indicates lesion or tumor is located more anteriorly in the postchiasm

Occipital Tract: Lateral Geniculates

- Incomplete
- Incongruous
- Homonymous hemianopsia
- Starts as quadrants that spare and progresses to macular splitting.
- Usually pituitary tumor
- Incongruous
- Homonymous hemianopsia
- Tumor usually not found until autopsy

Optic Radiations:

- Most commonly caused by stroke
- Defects usually permanent
- Tumors/injuries rare
- Homonymous Hemianopsia

Occipital Lobe:

- Stroke or trauma
- Identical defects
Parietal Lobe Tumors

Hallucinations:
* formed
  people, trees, boats
* unformed
  lightning or colored streaks

LISTEN to what the patient is telling you!

"Just because someone is "off the beam" doesn't mean they can't have a brain tumor as well!"

The story of Bert........

or...... when not to jump to conclusions...

Temporal Lobe Tumors

Symptoms of temporal lobe damage:
* disturbance of auditory perception
* visual disturbances
* altered personality and affective behavior (increased aggression and paranoia)
* altered sexual behavior
* altered language comprehension
* disturbance of memory

"Pie on the Floor"

- Can be congruous or incongruous
- IF a defect does not take up the majority of the quadrant it is a sector defect. IF it takes the full quadrant, it is a quadranaopia.
- IF right parietal lobe injured, will have left inferior quadranaopia

"Pie in the Sky"

Same principal as Pie on the Floor

Where is this defect in this example ??

Gain versus Hysterical

Gain
By feigning blindness the patient is trying to "gain" something. Usually a financial gain. Blatantly tries to "prove" they cannot see by tripping over objects, missing chairs when they sit. 5 degree fields

Hysterical
Truly believe they are blind. Usually they have been traumatized. Very cooperative during exam. In most cases, need psychological help to fix the issue - hopefully regaining vision. No fields. "blind"
5° Fields: "Tubular Fields"

Fatigue Fields: Spiral

Ready, Set....GO!
Congruous or Incongruous? Can we use these phrases?
Chiasm Postchiasm Prechiasm
Anterior Pathway or Posterior Pathway?

And............
What is the defect?
What has caused it?
Chiasm Prechiasm Postchiasm

How about a little HVF Action!
Which eye?
What is defect seen?
Prechiasmal Postchiasm Chiasm
What's the problem?

Be Very Careful Stepping Off That Cliff... The First Step's A Doozy 😊