Visual Field Testing: How To Get Good Results

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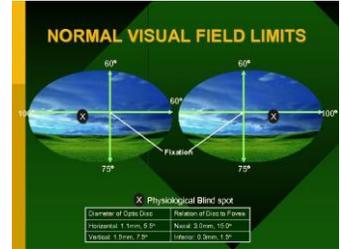MSOL, CPOT, ABOC, COA, OSC

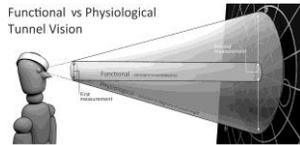See The Light Consulting

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Objectives

1. What is a visual field?
2. What is visual field testing?
3. How to perform a visual field test
4. What are the different types of visual fields?
5. What are different types of visual field defects?
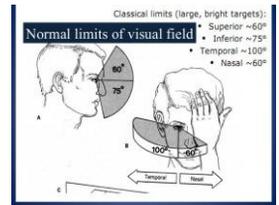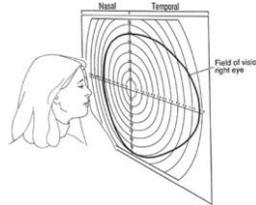6. How to get good results!

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What is a visual field?

Visual field is the **area that can be seen without moving the eyes or head**[1,2,3,4,5]. It includes what can be seen straight ahead and to the sides[1,2,4]. Vision is usually best in the middle of the visual field[1,4]. A visual field test can measure the extent and quality of the visual field as part of an eye exam[1,5].
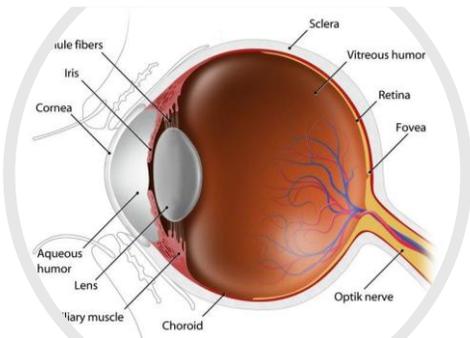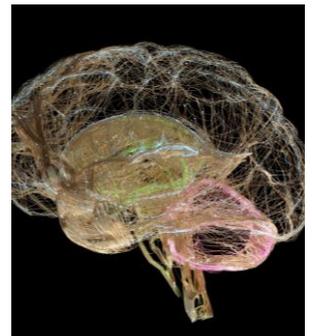

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Your Visual Field

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How many cranial nerves are there

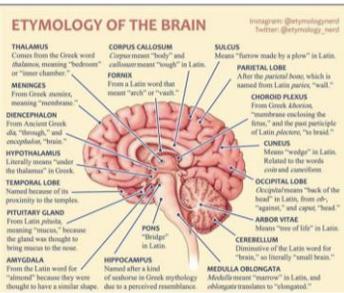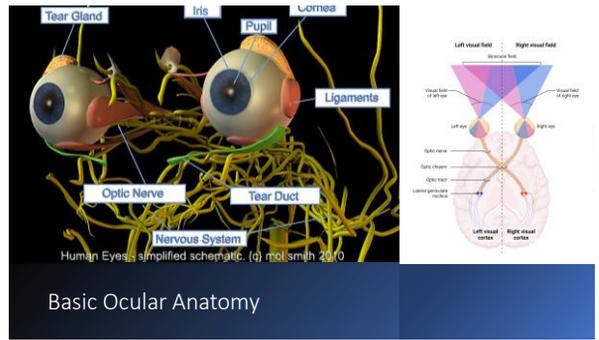- How many total cranial nerves are there?

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Slide 7

The Neuron System is complex

- 12 Cranial nerves
- 6 of them have a significant impact on the ocular system
- CN #2 is the optic nerve
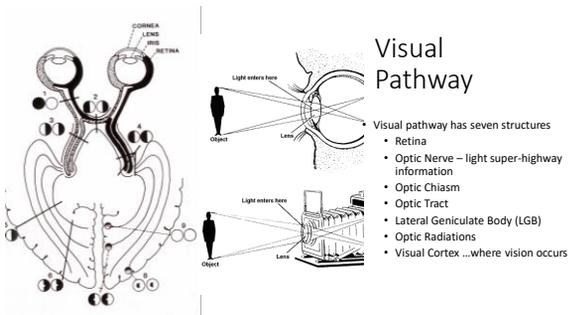- Vision occurs in the occipital lobe of the brain

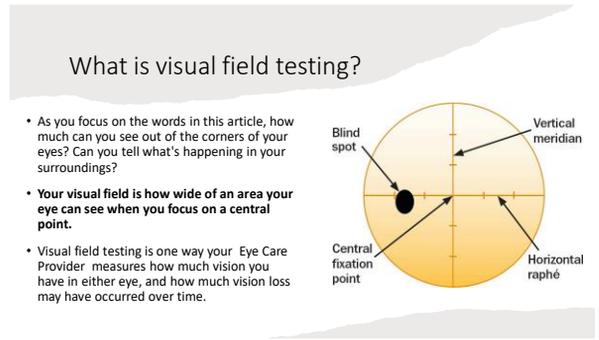

How parts of the brain got their names:
...see more

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Slide 8

Basic Ocular Anatomy

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Slide 9

Visual Pathway

- Visual pathway has seven structures
  - Retina
  - Optic Nerve – light super-highway information
  - Optic Chiasm
  - Optic Tract
  - Lateral Geniculate Body (LGB)
  - Optic Radiations
  - Visual Cortex ...where vision occurs

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What is visual field testing?

- As you focus on the words in this article, how much can you see out of the corners of your eyes? Can you tell what's happening in your surroundings?
- **Your visual field is how wide of an area your eye can see when you focus on a central point.**
- Visual field testing is one way your Eye Care Provider measures how much vision you have in either eye, and how much vision loss may have occurred over time.

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Slide 11

Two types of Visual Field Tests

- Kinetic
  - Uses moving light targets
  - Goldmann Field Perimetry
- Static
  - Automated with blinking lights
  - Brightness (0 = Brightest and 50 = dimmest)
  - Different target sizes (1-5)
  - Different speeds (normal or slow)
  - Different programs
    - 10-2 for central field 68 points (Plaquenil & vein/artery occlusions)
    - 24-2 standard glaucoma 54 points
    - 30-2 neuro pathway testing 76 points
    - 36 point – Ptosis testing
    - 120 point – screener

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Slide 12

Glaucoma Testing Terms

- DFE
- FDT
- Heidelberg (new technology)
- OCT
- HVF (reduces operator error
- Threshold testing
- FastPac Testing
- Rx is important
- Pupil Diameter (3mm min)
- Numeric data
- Gray scale
- Total deviation
- Pattern deviation
- Global Hemifield Test (GHT)
- Global indices (standards)
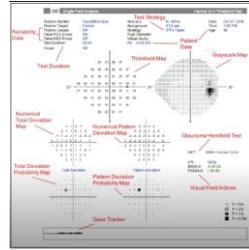- Pattern Standard Deviation (PSD)
- Mean Deviation (MD)

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Different types of visual field testing?

- Confrontation fields
- Automatic
  - 10-2 Macula, 24-2 Glaucoma, 30-2 – Neuro, 120 pt Screener, 36 pt Ptosis,
- Amsler Grid (key chain version)
- Static
- Kinetic
- FDT – Frequency Doubling Technology
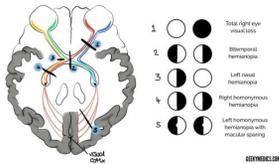- Headset Mounted

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Automated Visual Field – Industry Standard

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How to perform
Visual Field Testing

- Complete pt demographic info
- Add SRx and calculate age/Rx for test
- Select the appropriate test
- Patch the left eye*
- Proper pt instructions
- Proper alignment (pupil size 3mm)
- Monocular Field
- Add SRx and calculate *age
- Begin
- Different fields (SNIT)
  - Superior - 60 degrees
  - Nasal - 60 degrees
  - Inferior - 70 degrees
  - Temporal - 100 degrees

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Visual Field Testing

- Enter patient data
  - Recall patient data for establish pt
  - Enter patient's spectacle Rx
  - Add the correction for OD in lens holder*
- Select the appropriate test
- Position patient, check for comfort (critical for test results)
  - Proper alignment with monitor crosshair
- Constant monitoring (never leave the patient alone)
- Provide the appropriate instructions
- Complete test – save results!

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Visual Field Testing

- If the patient is dilated add +3.00 for lack of accommodation
- If the patient has had cataract surgery with standard lenses add +3.25
- When unable to perform test document the chart to reflect

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Patient Alignment and Instructions

- This test will determine the sensitivity of the connection between the eye and the brain
- The test will measure your central and peripheral vision
- You are to maintain your fixation on the fixation target
- There will be lights around the fixation target, do not chase them with your eyes
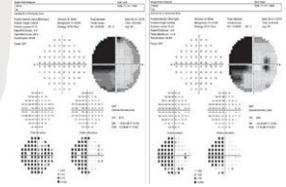
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Patient instructions continued…

- Some of the lights will be bright, some dim barely visible, when ever you see a light flash, hit the responder
- If you need a break, please hold the button down and do not let it go until we talk
- Blink normally while testing
- If you get more than 3 fixation losses, we will restart the test

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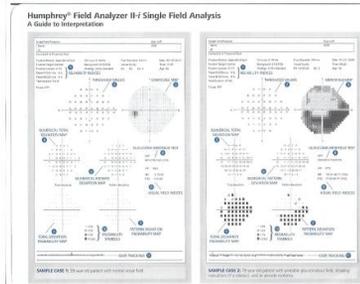## Analysis of Automated Visual Field Tests

- Reliability is important
- Threshold Values
- Grayscale map – patient sensitivity
- Total deviation – depth of field
- Pattern deviation – localized defects
- Glaucoma Hemifield Test (GHT) above and below the horizontal line
- Visual Field Indices -
- Probability Symbols
- Gaze Tracking

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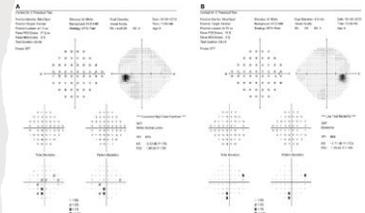## Analysis of Automated Visual Field Tests

- SITA Fast or SITA Standard
- Reliability is important
- Threshold Values
- Grayscale map – pictorial overview of pts raw data
- Total deviation decibels based on age
- Pattern deviation – factors out relative noise, fine tunes
- Glaucoma Hemifield Test (GHT) – takes advantage of asymmetry field loss
- Visual Field Indices
- Probability Symbols
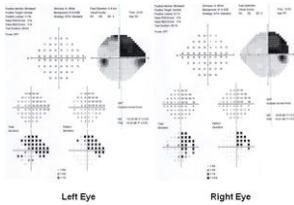- Gaze Tracking

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Interpretation Guide

Reliability Indices (FP, FN, FL)
- False positives (trigger happy)
  - Responded when there is no stimulus
- False negatives
  - Missing previous area responded to
- Fixation loss rate*
  - Patient not fixated on the target
  - Poor blinking*
- Gray scale map
  - Raw decibel sensitivity / dark area –reduced sensitivity
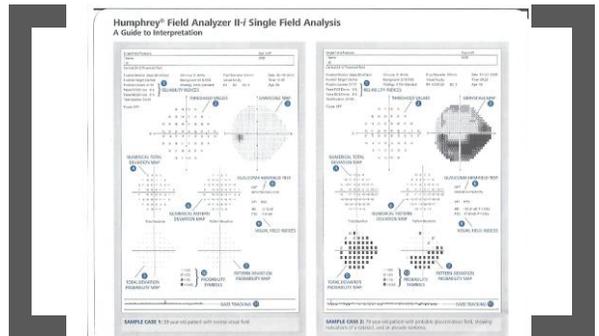- Threshold Values
  - Measured decibel – test point sensitivity

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Interpretation Guide cont…

- Total and Pattern deviation
  - Must compare total and pattern deviation maps to each other
    - Numerical total deviation
    - Numerical pattern deviation
  - Total probability -
- Visual Field Indices
  - VFI – less affected by cataracts / ganglion cell layer
  - MD - age-normal deviation
  - PSD – irregularities in the field from localized field loss
- Glaucoma Hemifield Test (GHT)
  - Pattern deviation associated with glaucoma

Left Eye   Right Eye

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Goldmann Perimetry

In Goldmann perimetry, an isopter is plotted kinetically by moving the test target from the periphery or non-seeing area to an area where it is seen by the patient. The test target is also projected statically at a single location and the brightness increased until the patient sees it. These two methods are then used to determine a patient's field of vision, or the actual area within which the eye is able to detect the presence of an object or stimulus.

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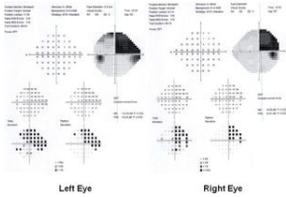## Interpretation Guide

Reliability Indices (FP, FN, FL)
- False positives (trigger happy)
  - Responded when there is no stimulus
- False negatives
  - Missing previous response area seen
  - Pt may be dozing off
- Fixation loss rate
  - Patient not fixated on the target
  - In the blind spot area
- Gray scale map
  - Raw decibel sensitivity / dark area –reduced sensitivity
- Threshold Values
  - Measured decibel – test point sensitivity
  - 0-50 0= brightest   50=dimmest

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Interpretation Guide cont…

- Total and Pattern deviation
  - Must compare total and pattern deviation maps to each other
    - Numerical total deviation
    - Numerical pattern deviation
    - Compares to normative data base
  - Total probability -
- Visual Field Indices
  - VFI – less affected by cataracts / ganglion cell layer
  - MD - age-normal deviation
  - PSD – irregularities in the field from localized field loss
- Glaucoma Hemifield Test (GHT)
  - Pattern deviation associated with glaucoma

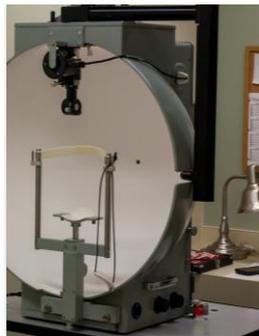Left Eye   Right Eye

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Virtual Visual Field

- Consistent with virtual reality instructions
- Better with patients with tremors
- Better for patients with back and neck issues
- Caution with claustrophobic pts
- Caution with patients with vertigo
- We can't see the eyes of the pts

THE NEW STANDARD IN VISUAL FIELD TESTING: VF2000 VR VISUAL FIELD HEADSETS

MICRO MEDICAL DEVICES

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Goldmann Perimetry

In Goldmann perimetry, an isopter is plotted kinetically by moving the test target from the periphery or non-seeing area to an area where it is seen by the patient. The test target is also projected statically at a single location and the brightness increased until the patient sees it. These two methods are then used to determine a patient's field of vision, or the actual area within which the eye can detect the presence of an object or stimulus.
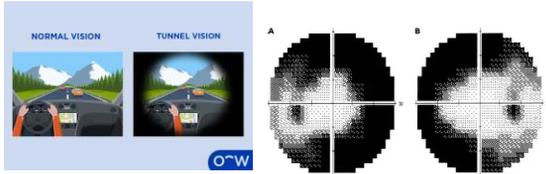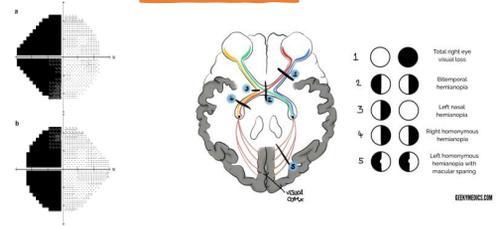
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3D Headsets

Meta Quest 2

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Different types of visual field defects?

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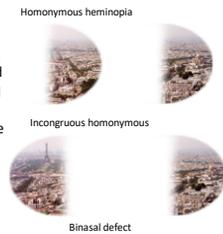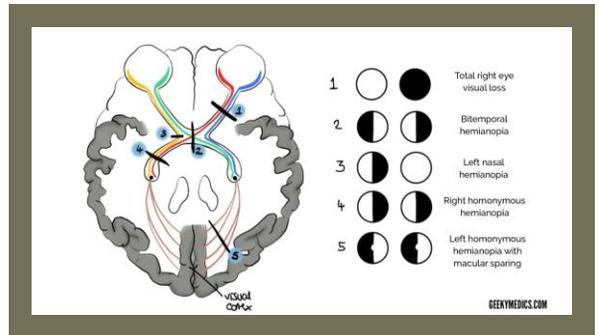## Different types of visual field defects?

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Visual Field Defects

- Common types of field defects
  - Blind spots - Areas of blindness in the visual field
  - Hemianopsia - Blindness in one half of the visual field of one or both eyes
    - Homonymous - Involving the nasal half of the visual field of one eye and the temporal half of the visual field of the other eye
    - Incongruous – strange shaped visual fields

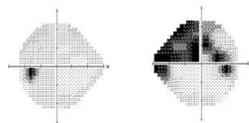Homonymous heminopia

Incongruous homonymous

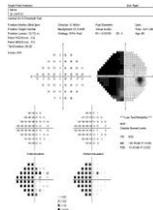Binasal defect

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Types of Visual Fields

- 10-2 – central field test
- 24-2 – std glaucoma test
- 30-2 – std neurological test
- 36pt – ptosis test
- 120 pt – screening field
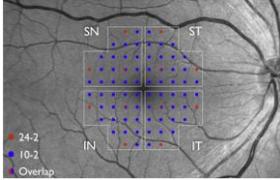- Drivers license exam

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Conditions where VF testing useful

- MS
- Stroke
- Optic Neuritis
- Retinitis Pigmentosa
- Vein/Arterial occlusion
- Plaquenil toxicity

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Emphasis On The Macula – OCT Testing

- Central 10-2 for early-stage glaucoma

- Central 12 points of the 24-2 does cover most patients

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When test is complete

- Have the patient sit back
- Verify testing is within the protocol parameters
- Ensure test is saved
- Return the lenses to the trial lens set
- **Verify entry into pts medical chart**
- Bill the testing visit

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Making Sure The You Get Good VF Results

- Staff training is a great place to begin, don't assume they know
  - Was the test done on SITA Standard or SITA Fast? (Swedish Interactive Threshold Algorithm)
- Verify your patient is the correct patient
- Pupil diameter must be at least 3mm
- Verify the correct test (don't assume the provider is ordering the same tests
- Patient position is paramount, comfort is king!
- Always monitor, never leave them alone, encourage them thru testing
  - Tell them if there is a fixation loss, and tell them if you have to restart test
- You may need to change test speed if patient response time is slow
- If patient has DED you may need to give lubricating drops before start
  - If the patient is tearing, you may need to pause the testing
- You may need to pause the testing if you notice pt struggling
- If the patient is wiggling, find out if they are comfortable

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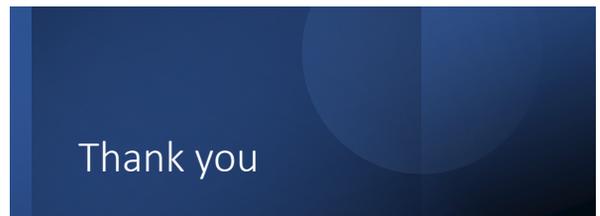## When not to perform a visual field test!

- When the patient is not well!
- If the patient says they are in too much pain to test
- Visual acuity is:
  - Hand motion (HM)
  - Light perception (LP)
  - No light perception (NLP)
- If there are no orders for the test in the patient's chart

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Billing examples

- Plaquenil
- Glaucoma
- Neuro testing
- Ptosis testing

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Thank you

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