VISUAL FIELDS

OBJECTIVES:
1. Explain what is meant by “30-2” in regards to the Humphrey Visual Field test
2. Identify the difference between a kinetic and a static test
3. Know the differences between a fixation loss, false positive error, and false negative error when performing a Humphrey Field Analyzer (HFA) Visual Field test

Getting the Terminology Sorted Out
• Visual Field: the full extent of the area visible to an eye that is fixating straight ahead (Measured in degrees from fixation)
• The NORMAL field of vision - for one eye - in a person without any systemic or ocular problems...

<table>
<thead>
<tr>
<th>DIRECTION OF Visual Field</th>
<th>MAXIMUM DEGREES SEEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior</td>
<td>60</td>
</tr>
<tr>
<td>Inferior</td>
<td>75</td>
</tr>
<tr>
<td>Temporal</td>
<td>100</td>
</tr>
<tr>
<td>Nasal</td>
<td>60</td>
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Getting the Terminology Sorted Out (cont.)
• Kinetic vs. Static Visual Field (perimetry) testing
  – Kinetic: stimuli is moved from a non-seeing area until they are first perceived (Example? GOLDMANN)
  – Static: non-moving stimuli are gradually increased in light intensity until perceived (Example? HUMPHREY)

Central fields vs. Peripheral fields (for Humphrey Field Analyzer [HFA])
• Central fields are tests from 0 degrees out to 30 degrees
• Peripheral fields are tests from 30 degrees to 60 degrees

Medically speaking...
• 0 to 5 degrees is “central” (fovea & macula)
• 6 to 8 degrees is “para-central”
• 9 to 30 degrees is “near-peripheral” (optic disk – ‘blind spot’ - shows up here @ about 15 degrees nasally)
• 30 to 60 degrees is “mid-peripheral”
• 60 to 100 degrees is “far-peripheral”
Getting the Terminology Sorted Out (cont.)

FIXATION POINT: Target patient looks @ throughout visual field testing

Getting the Terminology Sorted Out (cont.)

ISOPTER: Visual Field measurement showing a line connecting points of equal sensitivity to light.

Getting the Terminology Sorted Out (cont.)

SCOTOMA: “Blind Spot” = non-seeing area w/in the visual field that may occur w/damage to retina or visual pathway
– “Physiological Scotoma” – blind spot EVERYONE HAS due to the optic nerve head (no photoreceptors!)
– Positive Scotoma: a blind spot the patient is “aware” of (they can sense it) usually due to RETINAL injury
– Negative Scotoma: a blind spot the patient is UNAWARE of; usually due to damage of visual pathway
– Absolute Scotoma: no target can be seen in a particular location, regardless of how bright you make it
– Relative Scotoma: an area of the visual field in which perception of light is only diminished, not totally lost

Getting the Terminology Sorted Out (cont.)

DEPRESSION: a loss of sensitivity in a portion of the visual field that is abnormal for Pt’s age & diagnosis
– Pt CAN see things in the ‘depression’ but not at the sensitivity they SHOULD be able to see it (i.e., the target has to be brighter / bigger before they can ‘see’ it)

Most Common Visual Field Tests in Ophthalmology

• HFA 24-2 & 30-2 Threshold Tests
  – Stimulus duration: 200 milliseconds (1/5th of a second)
  – Testing distance: 30 cm (just a bit less than 12 inches)
• First number (24 or 30) indicates how far out the field is tested from FIXATION (24 or 30 degrees)
• Second number (-2) indicates that it is testing a point on EACH SIDE of the VERTICAL (Y-axis) & HORIZONTAL (X-axis) ‘mid-lines’. (The ‘old’ -1 test only checked one spot, right on the midline.)
• “Threshold” means test is going to find the ‘dimmest’ light pt can see at each tested location
Most Common Visual Field Tests in Ophthalmology

• **30-2** Threshold test measures **76 points**
• **24-2** Threshold test measures **54 points**

SCREENING TESTS

– **CENTRAL**
  • Central 40 (C-40) & Central 76 (C-76) tests
    – Both test out to 30 degrees from fixation
    – C-40 checks 40 points; C-76 checks 76
    • The Central 76 Screening has an **identical ‘test grid’ to the 30-2 Threshold field** (i.e., it checks the same points!)
    • If you run the ‘default’ test strategy, these tests can **quickly** tell you if pt is okay or further testing is needed

SCREENING TESTS (cont.)

• **PERIPHERAL** ("Full Field")
  – Full Field 81 & Full Field 120
    • Each tests out 55 degrees from fixation; all directions
    • Difference? FF 81 tests 81 pts; FF 120 tests 120 pts
  • **Fast way to see if there is an issue** requiring a more comprehensive test
  • Tests check **CENTRAL field first, then PERIPHERAL**; if you need trial lens for the CENTRAL field, test will “pause” & have you remove TRIAL LENS before moving onto PERIPHERAL test.

SPECIALTY TESTS

• **10-2** Threshold Test (tests out 10 degrees from fixation **& measures 68 points**)
• **MACULA** (tests out to **5 degrees**, in **2 degree** increments; **16 points tested**)
• **60-4** Threshold Test (measures the area from **30 degrees out to 60 degrees**, checking **60 points**)

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Most Common Visual Field Tests in Ophthalmology

**SPECIALTY TESTS:**
- **10-2 Threshold**
  - 10 degrees
  - 68 points
  - “Zooms” in on macular area

**PARAMETERS FOR TESTING**
- **Keep the lights off** when you start the HFA (VF machine)!
- **Fixation Target**
  - **Central** used for most people
  - **Diamonds** used for people with loss of central vision, like *Macular Degeneration*

**PARAMETERS FOR TESTING (cont.)**
- Fixation control: **blind spot monitor**

**PARAMETERS FOR TESTING (cont.)**
- Fixation control: **Video eye monitor**

**PARAMETERS FOR TESTING (cont.)**
- Fixation control: **Gaze tracking**

**GOOD GAZE TRACKING GRAPH**
- Big movement of eye (bad)
- Good Fixation; steady

**BAD GAZE TRACKING GRAPH** (test reliability will be poor)

**PARAMETERS FOR TESTING (cont.)**
- Fixation control: **Head tracking**
PARAMETERS FOR TESTING (cont.)

Fixation control: Vertex monitoring: 7mm or farther

TEST SPEED / TEST STRATEGY...
- Threshold test ‘strategies’:
  - Full Threshold (SLOWEST! Does ANYONE use this anymore?)
  - FastPac (40% faster than full threshold)
  - SITA Standard (50% faster than full threshold)
  - SITA Fast (twice as fast as “fast-pac”; 80% faster than full-threshold)
  - SITA-SWAP – Special test; for 24-2; uses a YELLOW background & size V BLUE target (available on the HFA 740i as an option; standard on the 745i & 750i)

PARAMETERS FOR TESTING (cont.)

TEST SPEED / TEST STRATEGY...
- Stimulus available:
  - White target / white background (the ‘std’)
  - Red target / white background (plaquenil?)
  - Blue target / white background
  - Blue target / yellow background (i.e., SITA SWAP); supposedly more sensitive; helps ‘detect’ glaucoma sooner?

PARAMETERS FOR TESTING (cont.)

PREPARING THE PATIENT FOR TESTING
- SEAT THE PATIENT
- EXPLAIN THE TEST
  - Lays the groundwork for how successful you will be in getting a good, valid, reliable test

PREPARING THE PATIENT FOR TESTING (cont.)
- SHOWING RESPONSE BUTTON OPERATION

PREPARING THE PATIENT FOR TESTING (cont.)
- PATCHING AN EYE
  - Strap pushing upper lid down
PREPARING THE PATIENT FOR TESTING (cont.)

• PROPER POSITIONING

PREPARING THE PATIENT FOR TESTING (cont.)

• TRIAL LENS LOCATION

CONDUCTING THE TEST – What Should You be Doing?

• WATCHING
  – Your SCREEN
    • Is Pt looking around? Falling asleep?
    • Blinking excessively? (Trial lens might be too close)
    • Lid drooping? Eye alignment good?
    • Fixation losses? False Positives? False Negatives?
  – The PATIENT!
    • Forehead still touching? (#1 issue); if ‘drifting away’, lower machine to make it easier for Pt to touch ALL THE TIME
    • Chin still in the chin cup?
    • Mouth CLOSED? (or is it gradually opening up...)

CONDUCTING THE TEST – What Should You be Doing? (cont.)

• COACHING / CORRECTING / ENCOURAGING
  – “You are doing good! That’s perfect”
  – “Click the button when you see the white lights, even if they are dim”
  – “Look at that yellow light in the center the WHOLE TIME; don’t look @ the white lights; just click the button when you see them.”
  – “Stay with me; you are almost done” (falling asleep)
  – “Teeth together, chin in the cup, forehead touching”

CONDUCTING THE TEST – What Should You be Doing? (cont.)

• Monitoring
  – Fixation Losses
    • Pt looking around?
    • If fixating great, RE- PLOT THE BLIND SPOT!
  – False Positive Errors
    • Pt is nervous and ‘trigger happy’
    • PAUSE the test; is pt still clicking the button?
  – False Negative Errors
    • Pt SHOULD be seeing the light but they aren’t clicking the button; are they falling asleep?
    • Is button working okay?
CONDUCTING THE TEST – What Should You be Doing? (cont.)

• Monitoring (cont.)
  – Maintaining Alignment

– Monitoring Patient

SAVING & PRINTING RESULTS

When HFA (Visual Field) test is done - SAVE IT!

SAVING & PRINTING RESULTS (cont.)

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SINGLE FIELD ANALYSIS (SFA)

Used when no ‘old’ tests to compare against

• **Glaucoma Hemifield Test (GHT)**
  – It evaluates the abnormal points in each zone pair (against a ‘normative’ database) & gives one of the following messages:
    – **WITHIN NORMAL LIMITS**
    – **OUTSIDE NORMAL LIMITS**
    or
    – **BORDERLINE**

SAVING & PRINTING RESULTS (cont.)

• **Visual Field Index (VFI)**
  – VFI = measure of the pt’s overall visual function as compared to an age-adjusted normal population.
  – For EXAMPLE: A VFI of 100% on a 24-2 test would mean that no points are depressed relative to age-adjusted normal.

SAVING & PRINTING RESULTS (cont.)

**Guided Progression Analysis (GPA)**

• Analysis for Visual Fields - highlights changes from baseline that are greater than the test-retest variability found for most glaucoma patients

• Two tests are averaged to establish Baseline; up to 14 “follow-up” tests may be compared to Baseline

• Can be used w/SITA Standard, SITA Fast & Full Threshold exams (can’t use for SITA SWAP exams)

• Analysis corrects for ocular media issues (such as ‘depressions’ caused by cataracts vs. actual glaucoma progression)
SAVING & PRINTING RESULTS (cont.)

• Serial Field Overview
  – The Overview printout shows results of up to 16 tests.
  – Condenses info shown in a Single Field Analysis (SFA)
  – Tests are printed in chronological order
  – Only shows results from 30-2 & 24-2 tests (will not show 10-2 results)
  – You get four formats: Graytone, Numeric, total Deviation probability plot, & Pattern Deviation probability plot
  – Date of test, VA, pupil size, GHT results, foveal threshold, fixation losses, false negative errors, false positive errors, & global indices all appear on the Serial Field Overview printout