المؤتمر السنوي الدولي للجمعية الرمدية المصرية
INTERNATIONAL CONGRESS OF THE
EGYPTIAN OPHTHALMOLOGICAL SOCIETY
EOS 2023

since 1902

Visual Field Test And Interpretation

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Assistant professor
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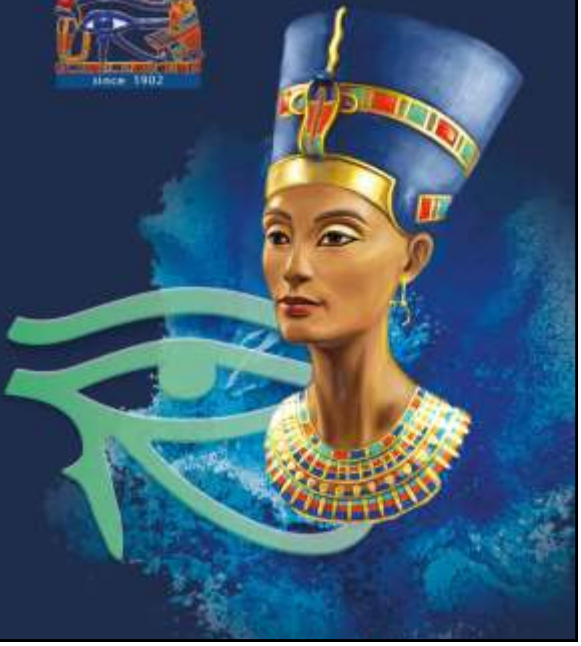
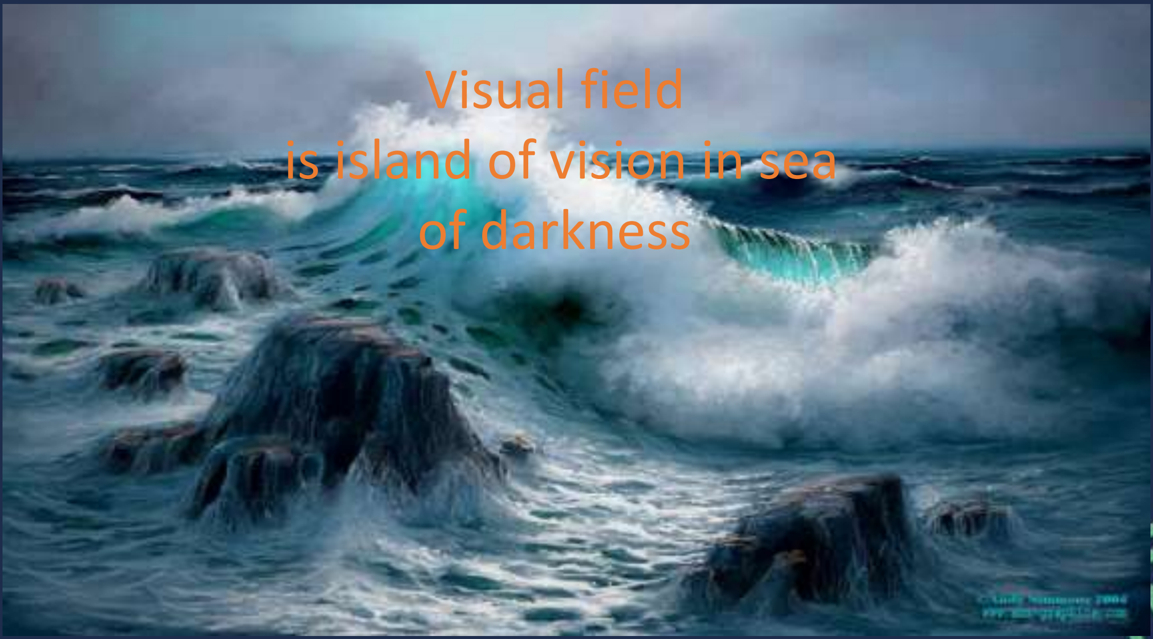
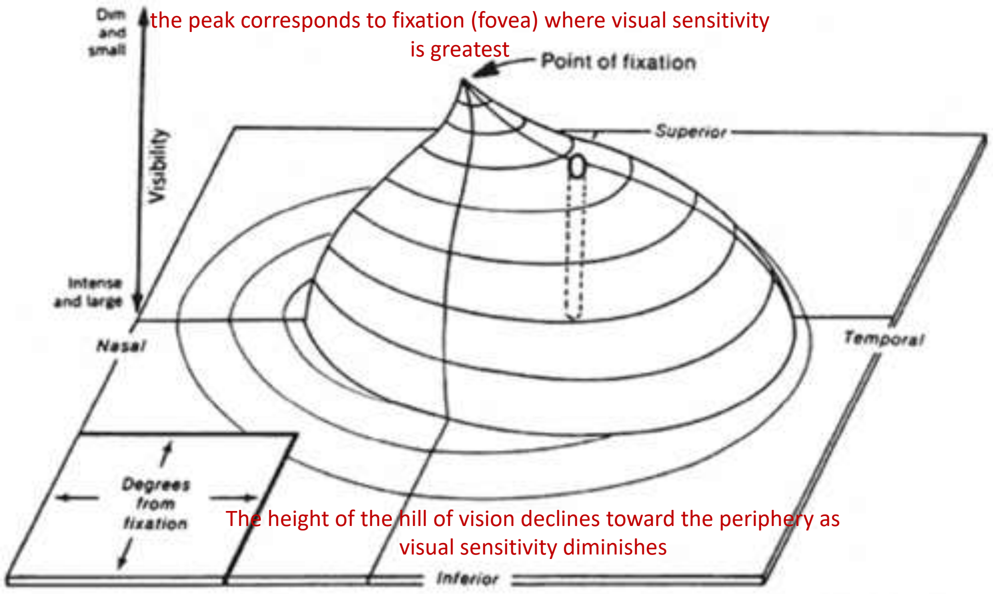




Visual field
is island of vision in sea of darkness

Types of Perimetry

- Kinetic perimetry:
  - -Confrontation VF test.
  - -Lister's perimetry.
  - -Tangent screen scotometry.
  - -Goldman perimetry (Octopus) .
- Static perimetry:
  - -Humphrey perimetry
  - -perimetry Goldman
- Newer VF technique :
  - -Frequency_ doubling perimetry
  - -Short wave length automated perimetry


Dim and small
Visibility
Intense and large
Point of fixation
Superior
Nasal
Temporal
Degrees from fixation
Inferior

the peak corresponds to fixation (fovea) where visual sensitivity is greatest

The height of the hill of vision declines toward the periphery as visual sensitivity diminishes

Humphrey print out analysis

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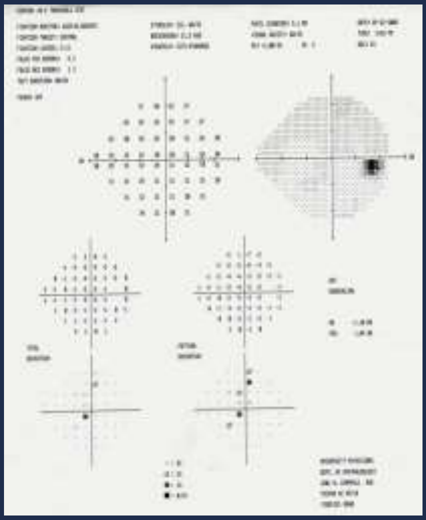
printout of Humphrey



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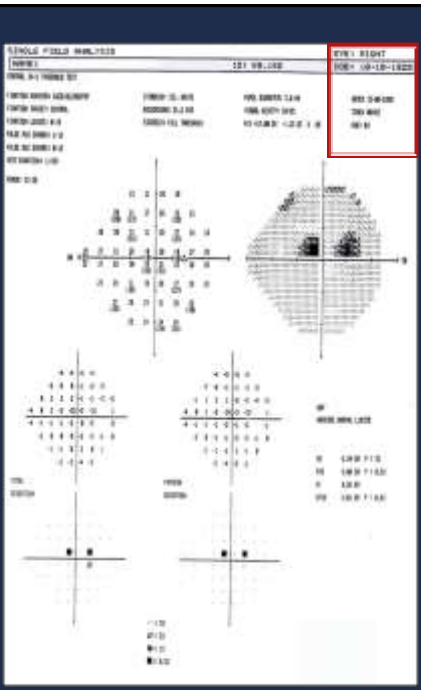
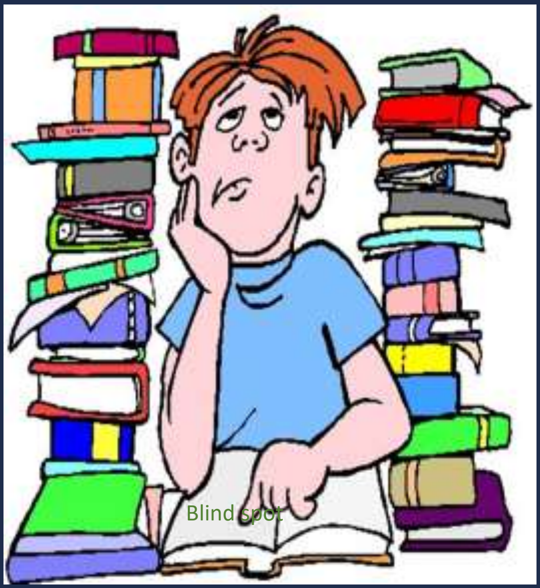
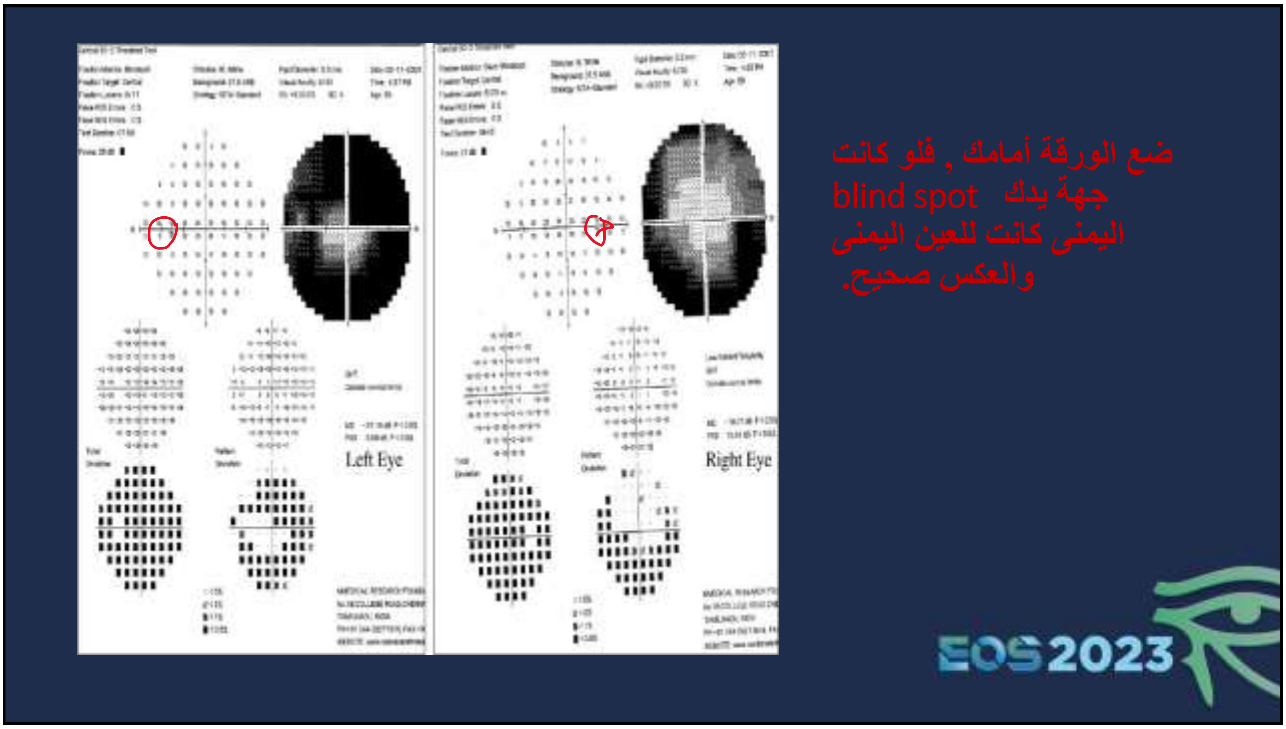


Eye: RE, or LE
Date: -/-/--
Time: - - -
Age: - - - -



How can differentiate between right and left eye in printout primetry ?

Look for blind spot


Left Eye
Right Eye

ضع الورقة أمامك , فلو كانت
blind spot جهة يدك
اليمنى كانت للعين اليمنى
والعكس صحيح.

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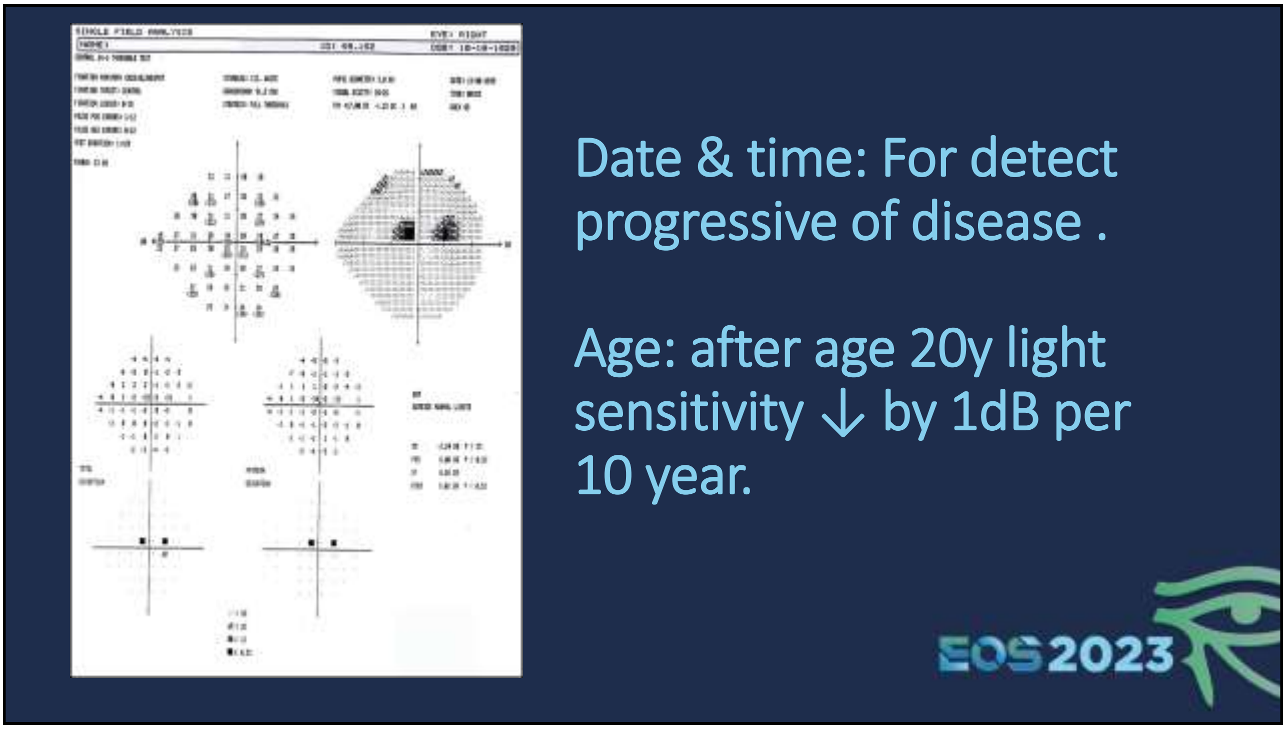
SINGLE FIELD ANALYSIS
EYE: RIGHT

Date & time: For detect progressive of disease .

Age: after age 20y light sensitivity ↓ by 1dB per 10 year.

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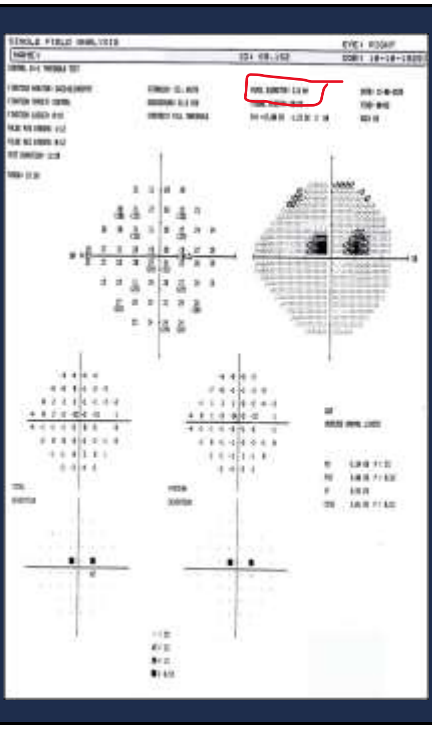
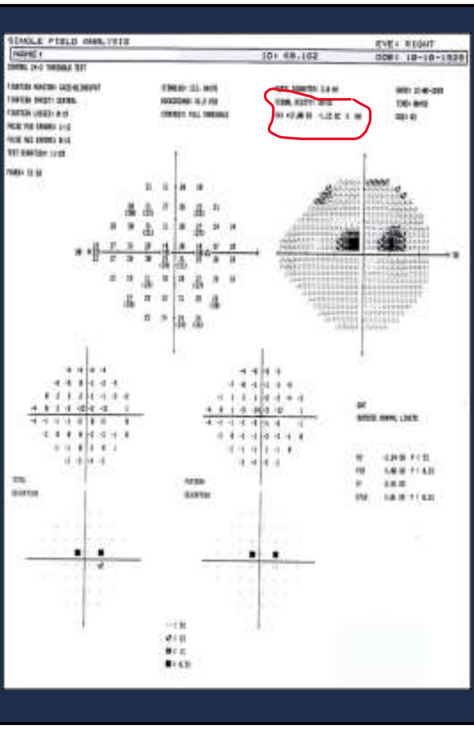


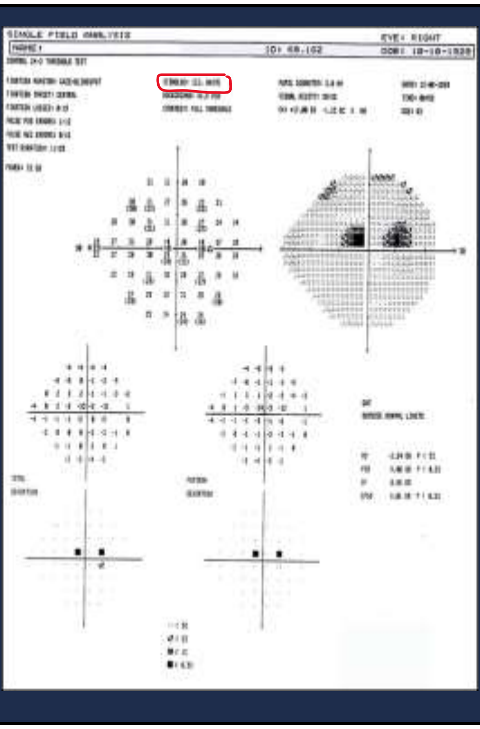
Pupil: if >2 mm >6 mm introducing artifacts due to light diffraction or induced aberrations.



VA& refraction:

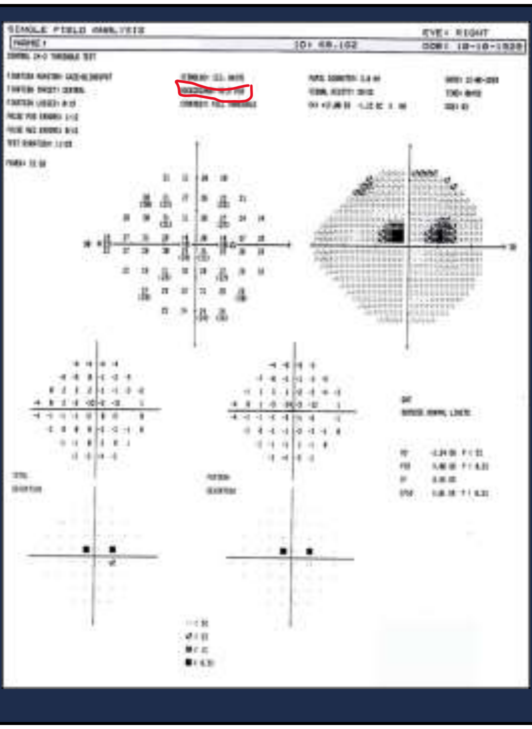
Astigmatism more than 1.25D should be corrected in addition to the sphere adjustments.

High myopia, even with full correction (contact lenses), can cause diffuse loss of sensitivity.



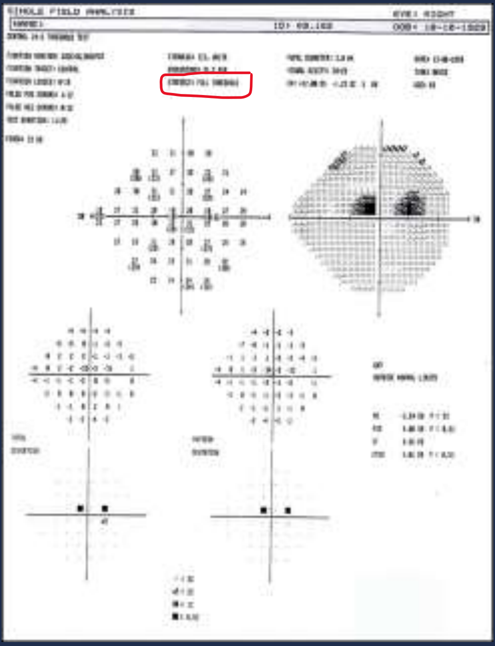
Stimulus : size of stimulus 0.25 mm2 to 64.00 mm2 represented by Roman numerals I-V

III 4mm2



Background: light intensity in apostilbs (31.5 asb), which was chosen as standard to create scotopic light conditions

was originally set as the standard for Goldmann {asb: It is a measure of differential light threshold – measured in units of brightness per unit area}



SINGLE FIELD ANALYSIS
EYE: RIGHT

1-full threshold.
2-Suprathreshold.
3-SITA (Swedish interactive thresholding algorithm)

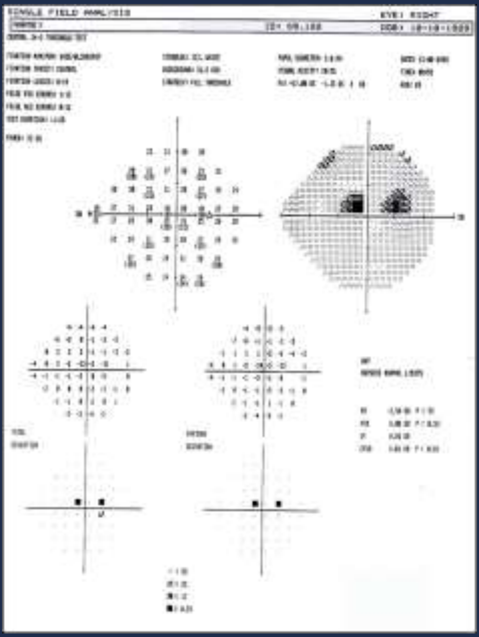
Strategy

- full threshold
- Exact threshold of the eye is
- measured in every point .
- 4db are used until detected then retested at this point in 2db .

- It used for detail assessment , it is gold standard for monitoring glaucoma.
- but it is take long time which cause fatigue for pt. & there is significant learning effect .

- Suprathreshold strategy:

- 6db are used , (stimuli at luminance level expected normal threshold value).
- Mainly used for screening.
- It is rapid (take 6 min per eye).

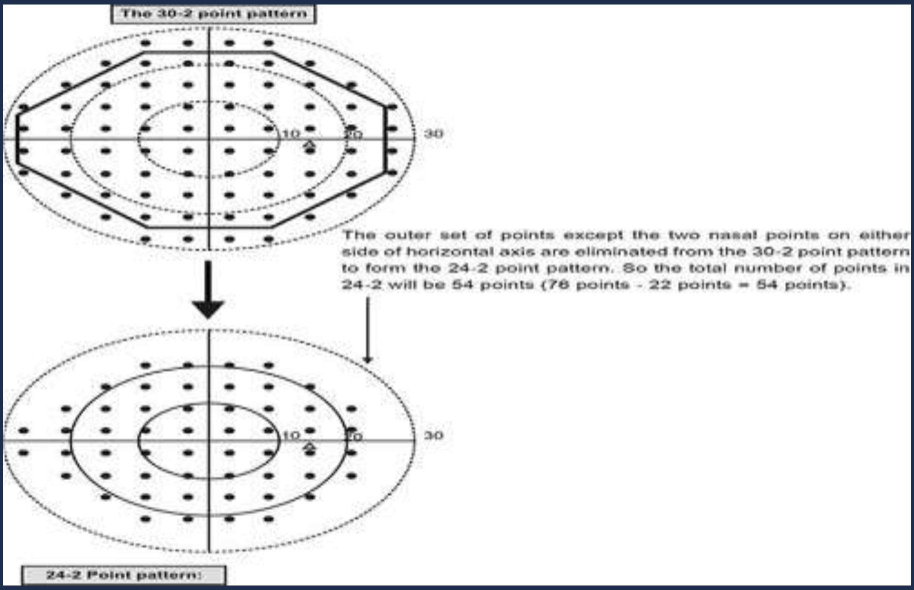


Central: 24 or 30-1 or 2:

What you mean by 10, 24 or 30 – 1 or2?

24 & 30 indicate area of tested field in degree of fixation.

24: test 54 point, but 30: test 76 point.

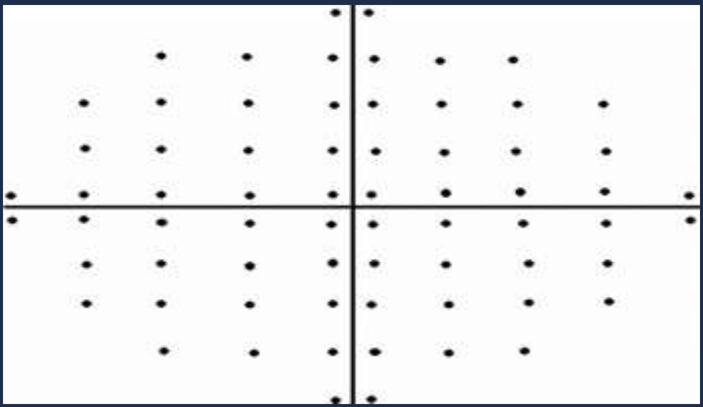

The 30-2 point pattern
10
20
30
10
20
30
24-2 Point pattern:

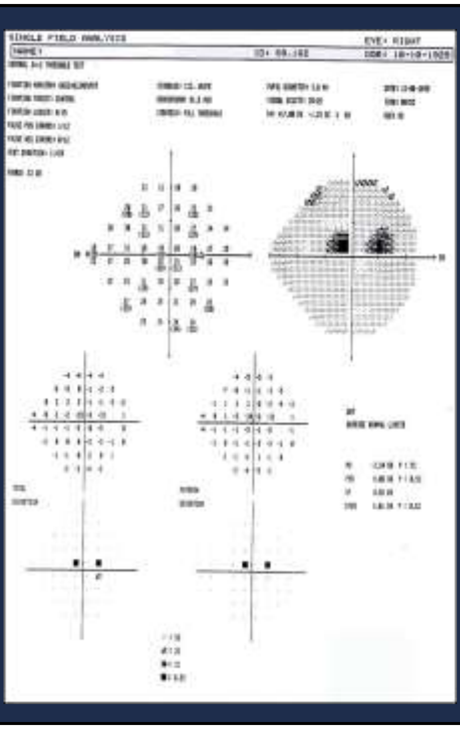
The outer set of points except the two nasal points on either side of horizontal axis are eliminated from the 30-2 point pattern to form the 24-2 point pattern. So the total number of points in 24-2 will be 54 points (76 points - 22 points = 54 points).

-1 & -2 describe the pattern of point tested:

-1 include point along vertical & horizontal meridian.

-2 involve grid of test point space 6° apart Offset from vertical & horizontal meridian





Reliability Indices:

-Fixation loss: -/-

-False positive : -/-

-False negative: -/-

Fixation loss

- Detect by present stimuli in blind spot
- Normal is less than 20%

False positive

- Positive response but no stimuli.
- Detect when the stimuli accompanied by sound.
- High false positive occur in trigger happy pt.
- Normal value should be less than 25% .

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False negative

- Negative response with brighter than threshold stimuli .
- High false negative occur in inattention, fatigue & pt falling sleep.
- Normal value should be less than 33% .

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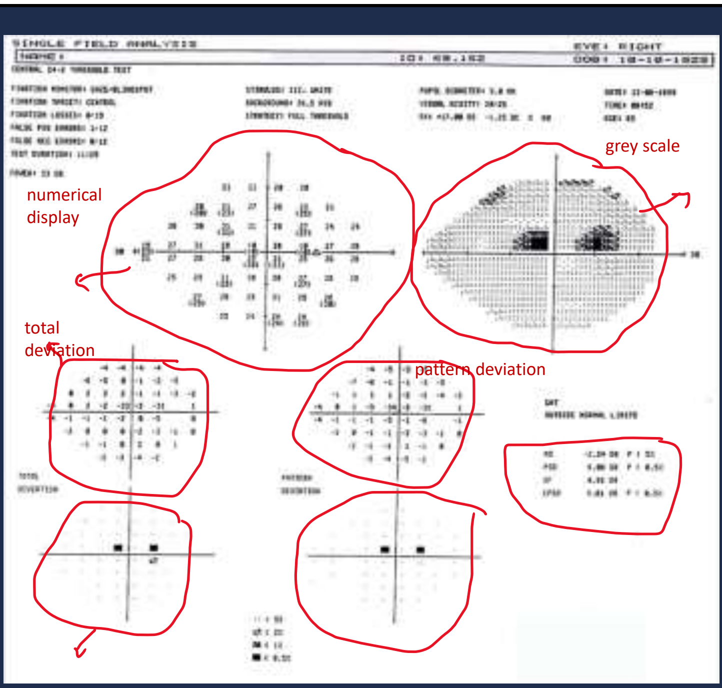
SINGLE FIELD ANALYSIS
EYE: RIGHT
numerical display
grey scale
total deviation
pattern deviation

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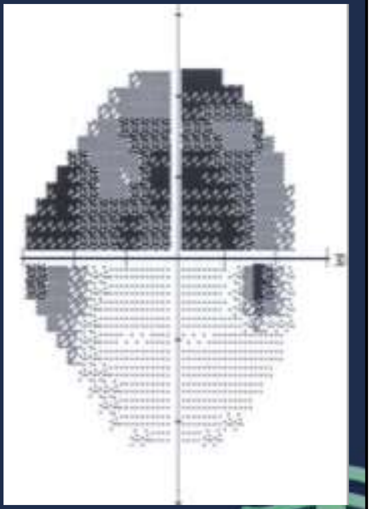
Grey scale

- decrease sensitivity is represented by darker tone .
- In general do not make Dx based on grey scale



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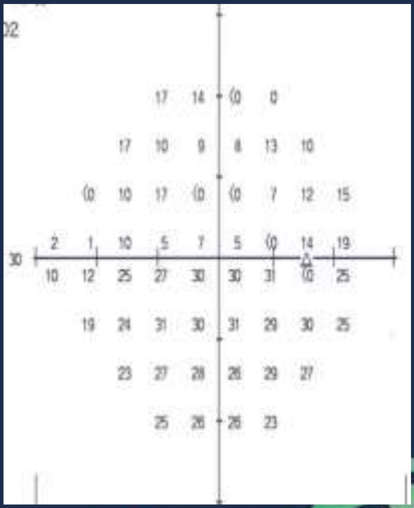
Numerical display

- give threshold for all point checked in decibel.



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Total deviation

- calculate by comparing the Pt. measurement with age matched control .
- numerical scale:
  - Zero= expected threshold for that age.
  - +ve point = more sensitive threshold for that age.
  - -ve point =Depressed threshold for that age.

grey scale: (Symbol plot)

The darker is more significant

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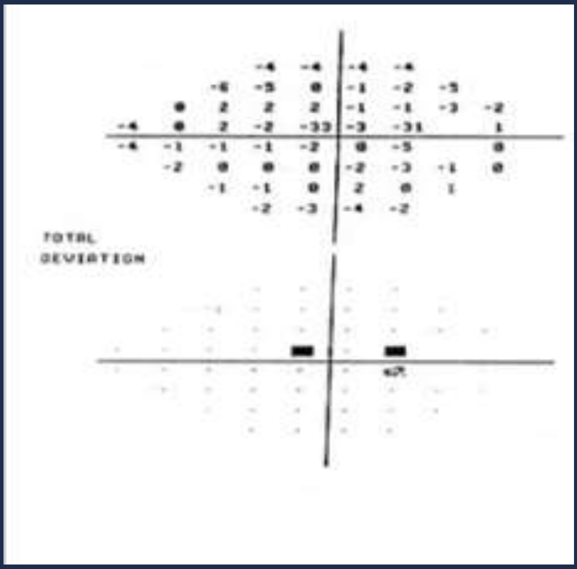
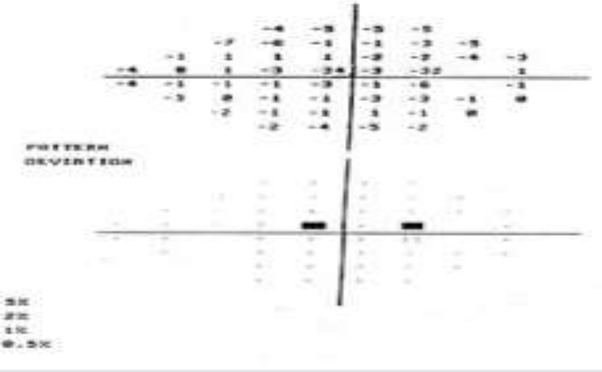


Pattern deviation

- adjust for any generalized depression in overall field.



Global indices

- Summery of result as single number used to monitor change.

Mean deviation (MD):

it is average deviation of each point from age corrected group.

P values are < 5%, < 2%, < 1% and < 0.5%

The lower the p value the greater the significance

Pattern stander deviation (PSD):

measure the focal loss or variability within the field taking into account any generalized depression.

Remember: MD= Minus is bad, PSD= Plus is bad

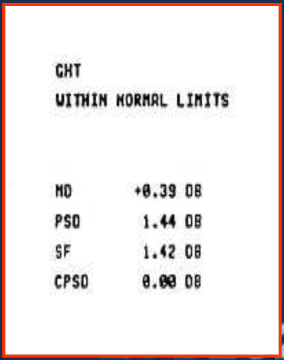
- Short term fluctuation (SF):

Indicate of the consistency of responses , asses by retest 10 point .

corrected pattern stander deviation (CPSD):

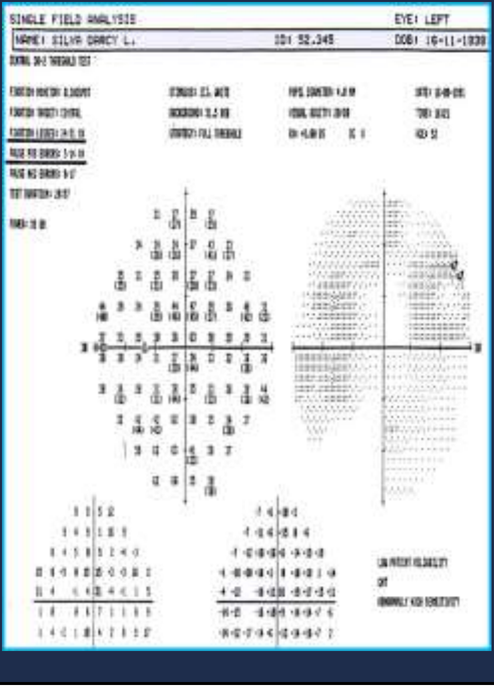
measure the variability within the field after correcting for SF (intra-test variability) .

High CPSD indicate localized irregularity .



```
GHT
WITHIN NORMAL LIMITS

MD        +0.39 DB
PSD        1.44 DB
SF         1.42 DB
CPSD       0.00 DB
```



SINGLE FIELD ANALYSIS EYE: LEFT

NAME: SILVA DARCY L. ID: 52.345 DOB: 16-11-1938

- Fixation loss: 24/ 31 (77.4%).
- False pos. error: 5/14 (35.7%) .
- False neg. error: 8/17 (47%).

Unreliable test

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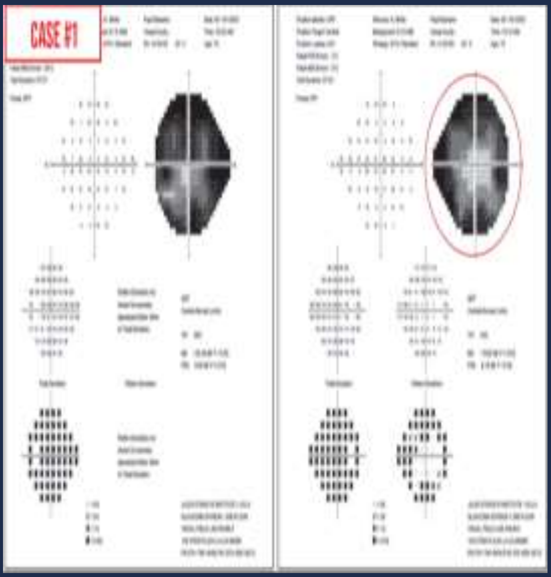

- At first glance, the visual field defects look like dense arcuate scotomas. However, the central points in each quadrant are much lighter than the surrounding points. This is a classic “cloverleaf” pattern (see circled area)—a type of false negative result. The reason this occurs is that the testing algorithm always starts in the center of each quadrant; that’s where it does a threshold test, even if you’re using the SITA standard strategy. Test points spiral out from those central quadrant testing points.

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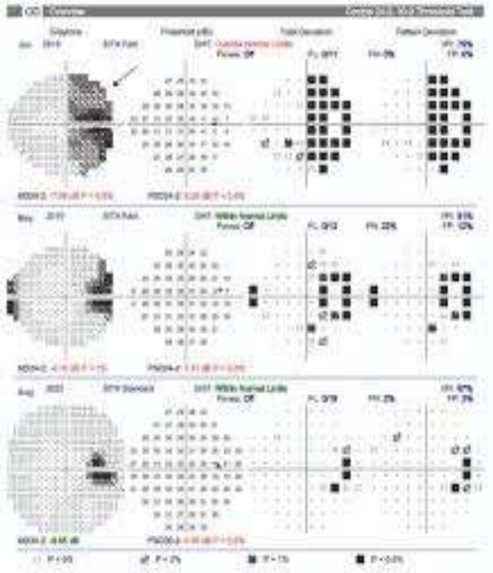

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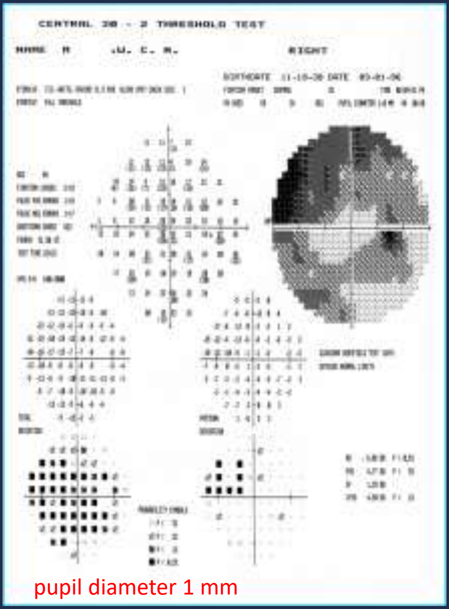
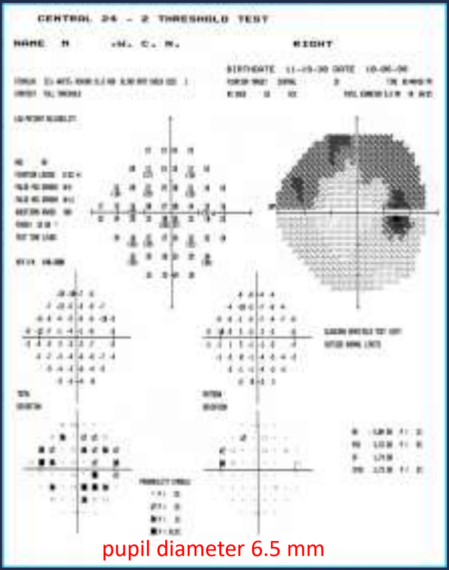


CENTRAL 30 - 2 THRESHOLD TEST

NAME

RIGHT

pupil diameter 1 mm



CENTRAL 24 - 2 THRESHOLD TEST

NAME

RIGHT

pupil diameter 6.5 mm

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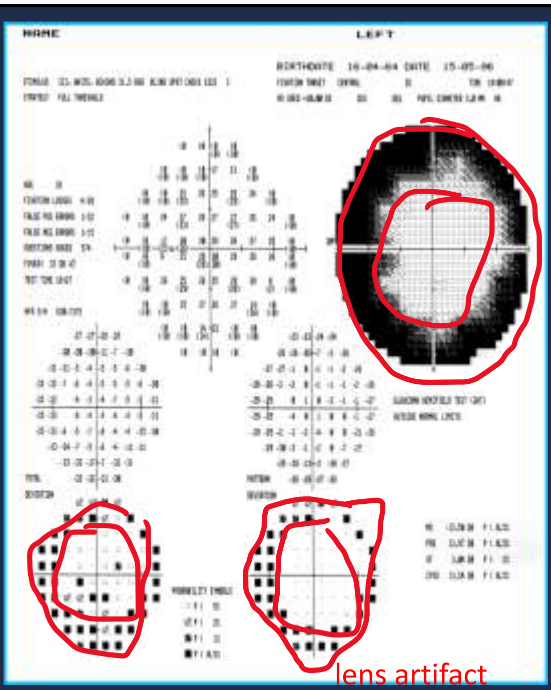
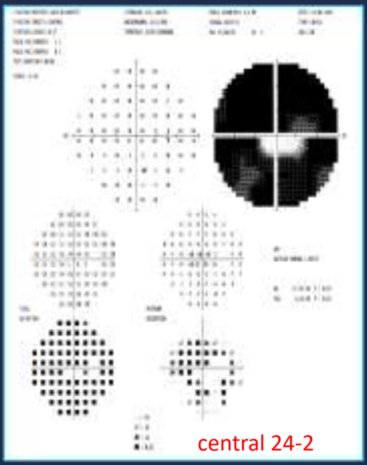
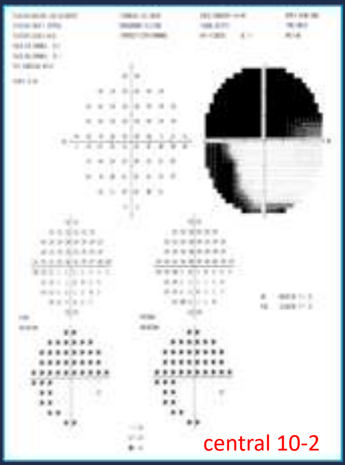


lens artifact

Both of the same pt. at the same time

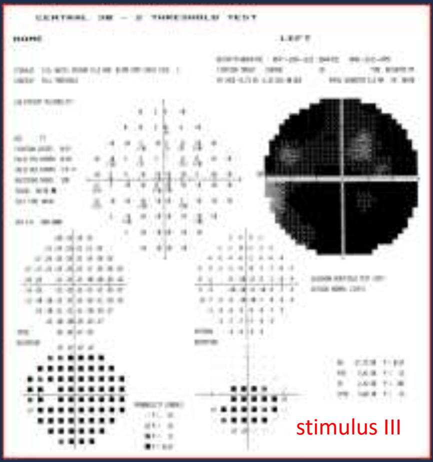


central 24-2

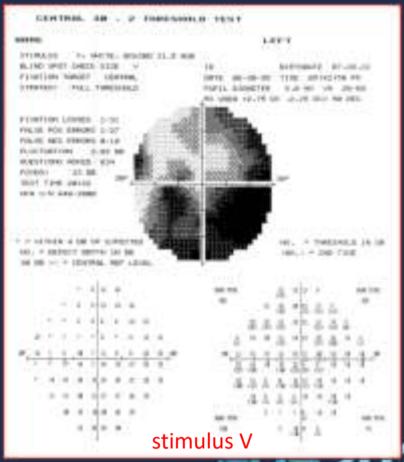


central 10-2

Both of the same pt. at the same time



stimulus III



stimulus V

Short Wave length Automated Perimetry (SWAP)

- Blue object on yellow background.
- Blue yellow ganglion cell lost first in glaucoma.
- It is sensitive than conventional white on white VF perimetry in early glaucoma damage.
- Detect abnormal VF 2-5 years before white on white VF test become abnormal.

Disadvantages

- 1- total test time.
- 2- difficult to set up test.
- 3- high short term fluctuation.
- 4- data effect by lens opacity.

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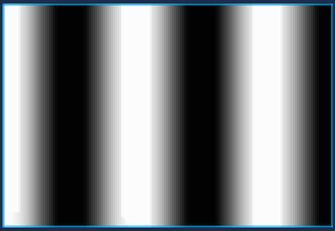
Frequency-Doubling Technology

- It is measure the function of specialized retinal ganglion cell (large magnocellular * M-cell* pathway fiber).
- Rapid reversal of broad black & white bars creating doubling frequency illusion



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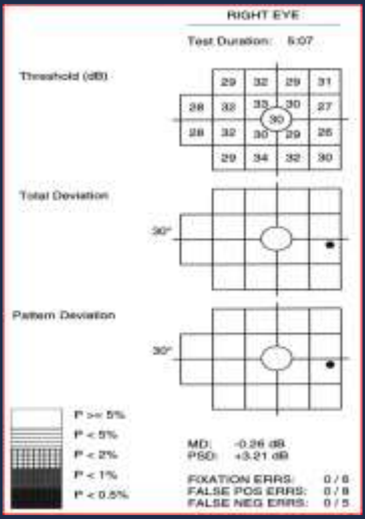
Advantages

- 1-↓Test time
- 2-Required minimal training
- 3-Relativly portable
- 4-no need for patching (not sensitive to background illumination
- 5-Independing to refractive error (up to ± 7).



RIGHT EYE

Test Duration: 5:07

Threshold (dB)

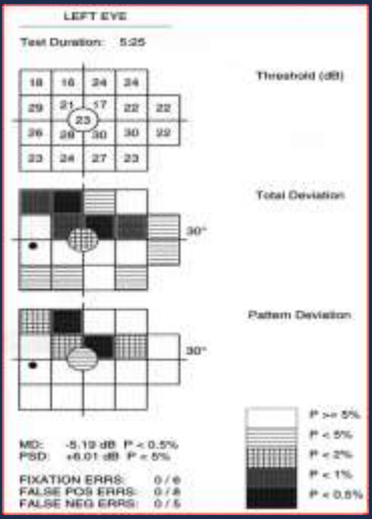
29 32 29 31
28 32 33 30 27
30
28 32 30 29 26
29 34 32 30

Total Deviation

Pattern Deviation

MD: -0.26 dB
PSD: +3.21 dB

FIXATION ERRS: 0 / 6
FALSE POS ERRS: 0 / 8
FALSE NEG ERRS: 0 / 5



LEFT EYE

Test Duration: 5:25

Threshold (dB)

18 16 24 24
29 21 17 22 22
23
26 28 30 30 22
23 24 27 23

Total Deviation

Pattern Deviation

MD: -5.19 dB P < 0.5%
PSD: +6.01 dB P < 5%

FIXATION ERRS: 0 / 6
FALSE POS ERRS: 0 / 8
FALSE NEG ERRS: 0 / 5