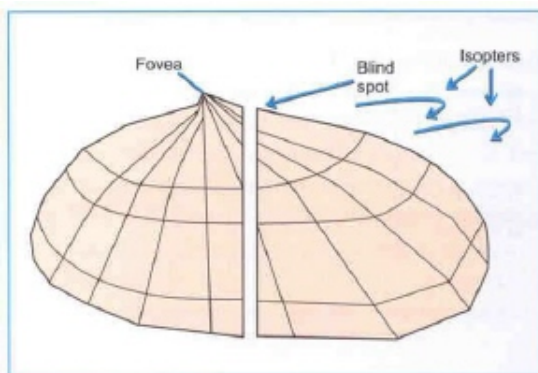


INTERPRETING AUTOMATED PERIMETRY

This didactic lecture was presented by [Dr Rahul Shukla](#) on 21-08-05 at Hotel Satya Ashoka. The program was sponsored by Avesta Division of Sun Pharma.

FIELD OF VISION

It is an island of vision in the sea of darkness, with mountains and georges.
Mountain denotes fine vision. eg: at fovea.
George denotes no/less vision. eg: blind spot.



TYPES OF PERIMETRY

KINETIC PERIMETRY
STATIC PERIMETRY

EVOLUTION OF PERIMETRY

1. CONFRONTATION.
2. ARC PERIMETER which included manual as well as LISTER'S arc perimeter.
3. GOLDMAN'S PERIMETER(Manual) Concept of uniform background.
4. GOLDMAN'S AUTOMATED PERIMETER.

AUTOMATED PERIMETERS

1. HUMPHREY
2. OCTOPUS
3. MEDMONT

HUMPHREY

1. Most widely used perimeter.
2. Maximum studies done on it.

TERMINOLOGY & DEFINITIONS

FIXATION : It is that part of visual field that responds to fovea centralis.

CENTRAL FIELD: It is the portion of visual field within central 30 degrees of fixation.

ISOPTER: It is the outline of contiguous area of visual field capable of perceiving a given stimuli.

APOSTILBS(اسب): It is the unit of measurement of background illumination and stimulus intensity.

DECIBEL(db): It is 1/10th of logarithmic base of luminance in apostilbs.

Decibel is the unit taken into account in AP (Automated Perimetry).

0 db is maximum luminance and 50 db is minimum luminance. Fovea is 35-40 db.

THRESHOLD: It is the intensity of the stimulus perceived 50% of the time it is presented.

SUPRATHRESHOLD: It is the intensity of the stimulus that is perceived 95% of the time it is presented.

INFRATHRESHOLD: It is the intensity of the stimulus that is perceived 5% of the times it is presented.

NORMATIVE DATA

A P compares the sensitivity values of the patient with the stored values that have been obtained from normal people. This is normative data.

It varies with age, sex, refraction, media opacities, target size and intensity, pupillary size, etc etc.

PRINTOUT INTERPRETATION

HUMPREY used most.

Printout is divided into 8 Zones for easy and systematic interpretation.

DON'T JUMP TO ANY CONCLUSION WITHOUT SEEING ALL 8 ZONES AND CORELATING THEM CLINICALLY.

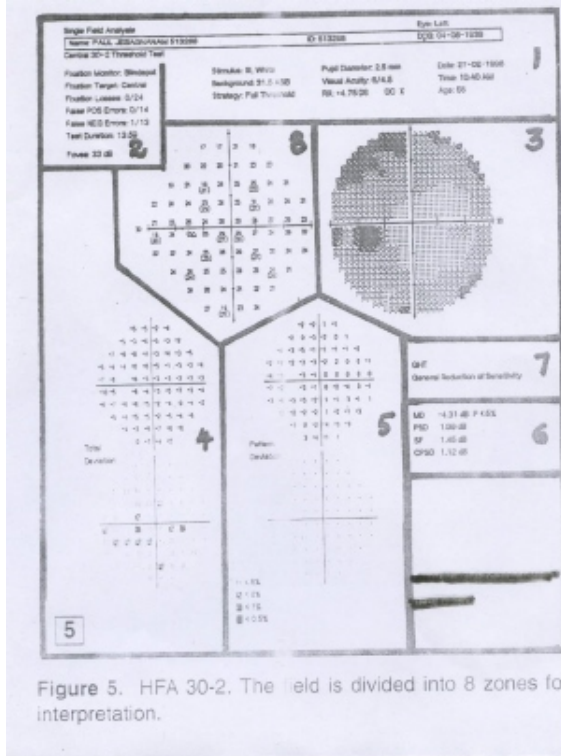


Figure 5. HFA 30-2. The field is divided into 8 zones for interpretation.

ZONE I

1. Patient Data
2. Test performed & strategy

1. PATIENT DATA

Name
Age/sex
Eye, right/left
Date /time
Pupillary diameter
Refractive correction

2. TEST PERFORMED & STRATEGY

Single field analysis
30-2/24-2/10-2
Threshold/full threshold
SITA standard/fast
Background, usually 31.5 asb
Stimulus size and colour

STIMULUS SIZE

These are Goldman targets white/yellow
I - 0.25 mm
II - 1 mm
III - 4 mm
IV - 16 mm
V - 64 mm

ZONE II

Fovea
Reliability indices
FALSE POSITIVE
FALSE NEGATIVE
FIXATION LOSSES
Total test duration

FALSE POSTIVE

This is recorded when patient responds by pressing the button when no stimulus has been presented.(only sound but no flash)

- Trigger happy patient.
- Abnormal high sensitivity.
- Flagged off when > 33%.

FALSE NEGATIVE

This is recorded when a patient fails to respond at a specific point to a specific intensity stimulus where he has responded earlier.(light stimulus but no sound)

- Indicates a fatigued patient.
- Typical clover leaf pattern defect.
- Flagged off if > 33%.

FIXATION LOSSES

3 Ways to check fixation.

- Infra red sensors.
- Closed circuit TV.
- Blind Spot fixation (Heijl Krakau method)

Commonly used is H.K method

ZONE III

Interpolated gray scale.

Light area denotes normal/high sensitivity.

Dark areas denote low sensitivity.

Just a glance is enough at this stage.

ZONE IV

TOTAL DEVIATION PLOT: it shows overall depression of the visual field.

- It is the point by point difference of patient's threshold from those expected in age corrected normals.
- It shows overall sinking of the hill of vision.
- Large scotoma's are depicted, it does not reveal hidden or small ones.

TOTAL DEVIATION PLOT - Causes of sinking of HOV:

Media opacities: Cataract, K.opacity, R.error, Miosis.

Rarely it can be due to advanced glaucoma.

Darkest dot has a 'p' value of $< 0.5\%$.

Lighter dot has a 'p' value of $< 5\%$.

Single dot is normal.

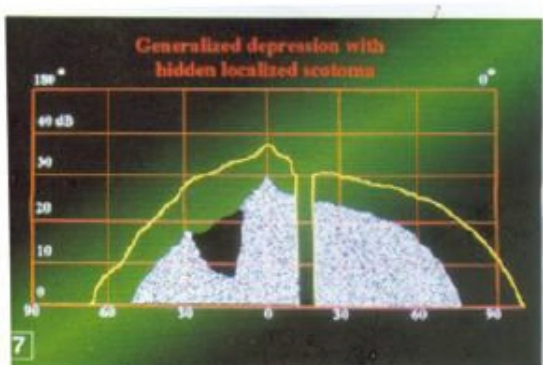
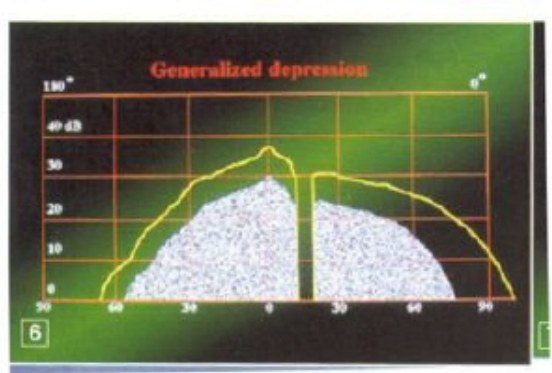
The 'p' Value

$< 5\%$ of the normal population.

$< 2\%$ of the normal population.

$< 1\%$ of the normal population.

$< 0.5\%$ of the normal population.



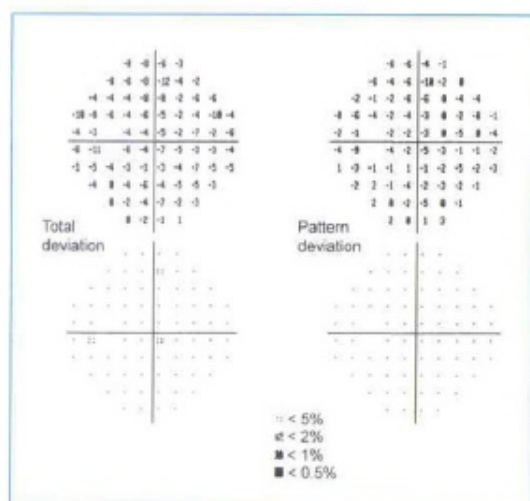
ZONE V

PATTERN DEVIATION PLOT

Machine adjusts for overall depression of visual field.

Thus localized defects are highlighted.

It is a numeric as well as a probability plot.



ZONE VI

GLOBAL INDICIES

1. MD Mean Deviation: Derived from Total Deviation plot. Indicates overall elevation and depression of patient's hill of vision.

2. PATTERN STANDARD DEVIATION PSD

Derived from T.D Plot after removing the mean deviation.

So if MD is road below the sea level.

PSD is the pot holes in the road.

3. SF : SHORT TERM FLUCTUATION

These are intra test variations.

Error in threshold determination.

Threshold values at 10 different points in visual field are obtained twice and standard deviation of these values is SF.

Indicates reliability and pathology.

PATHOLOGY: diseased points will have greater fluctuation, on repeated testing the given point will show low sensitivity.

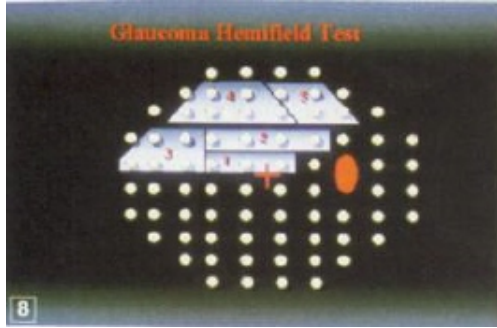
LOW RELIABILITY: Points tested lie in a normal visual field. OR Pt. responded at a point previously but not the second time.

ZONE VI

CSPD

Corrected Standard Pattern Deviation This is PD-SF.

GLAUCOMA HEMIFIELD TEST (ZONE VII)



5 Sectors in upper field are compared with 5 mirror images in lower field.

GHT OUTSIDE NORMAL LIMITS:

If in any given pair of sector (upper and lower) sensitivity values differ to an extent of what is present in <1% of the population.(p)

If each sector differs to an extent of what is present in <0.5% of normal population.(p)

GHT BORDERLINE

In comparing the upper and lower zone, at least one pair of sector differs to an extent of what is present in <3% of normal population.(p)

GHT ABNORMALLY LOW SENSITIVITY OR GENERALIZED REDUCTION IN SENSITIVITY

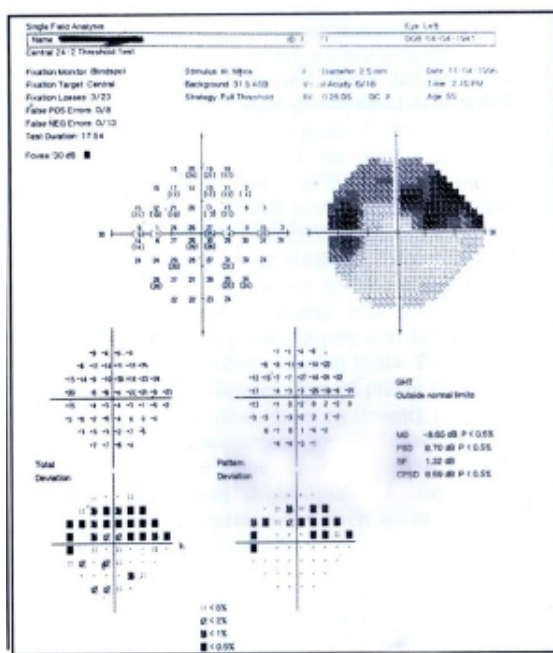
If neither of the 2 conditions of Outside Normal limits are met.

But the best part of visual field is depressed to a degree that occurs in <0.5% of population.(p)

GHT ABNORMALLY HIGH SENSITIVITY

The overall sensitivity in the visual field is higher than that found in 99.5% of the normal population.

CONFIRMATION OF GLAUCOMA FIELD DEFECT ANDERSON AND PATELLA CRITERIA



In an area of clinical suspicion

In a 30-2 test in PD, 3 non edge points are depressed to an extent of what is present in <5% of normal population.(p)

At least 1 point of these 3 should be depressed to an extent found in less than 1% of normal population.(p)

CSPD should be that found in <5% population.(p)

GHT should be 'OUTSIDE NORMAL LIMITS'.

SITA

Swedish Interactive Threshold Algorithm

It shows more abnormal points in PD, i.e. more shallow defects are likely to be picked up.

In global indices there are only MD and PSD.

There is no CPSD and SF.

It takes less time.

ANDERSON AND PATTELA'S CRITERIA FOR SITA

In an area of clinical suspicion

3 non edge points in 30-2 in PD, whose sensitivity is depressed to an extent of what is found in <5% of normal population.(p)

PSD should be that found in <5% of normal population.(p)

GHT should be Outside Normal Limits.