

- *Perimetry is the procedure for estimating extent of the visual fields*
- It is the measurement of **visual functions of** the eye at **topographically defined loci in the** visual field.

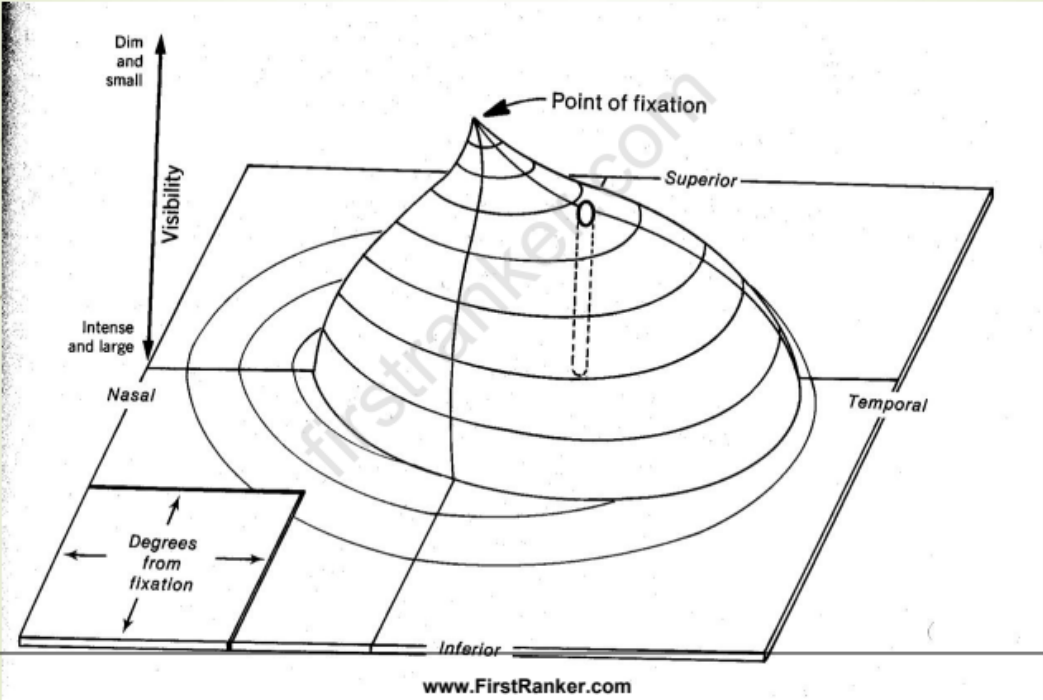
HISTORY

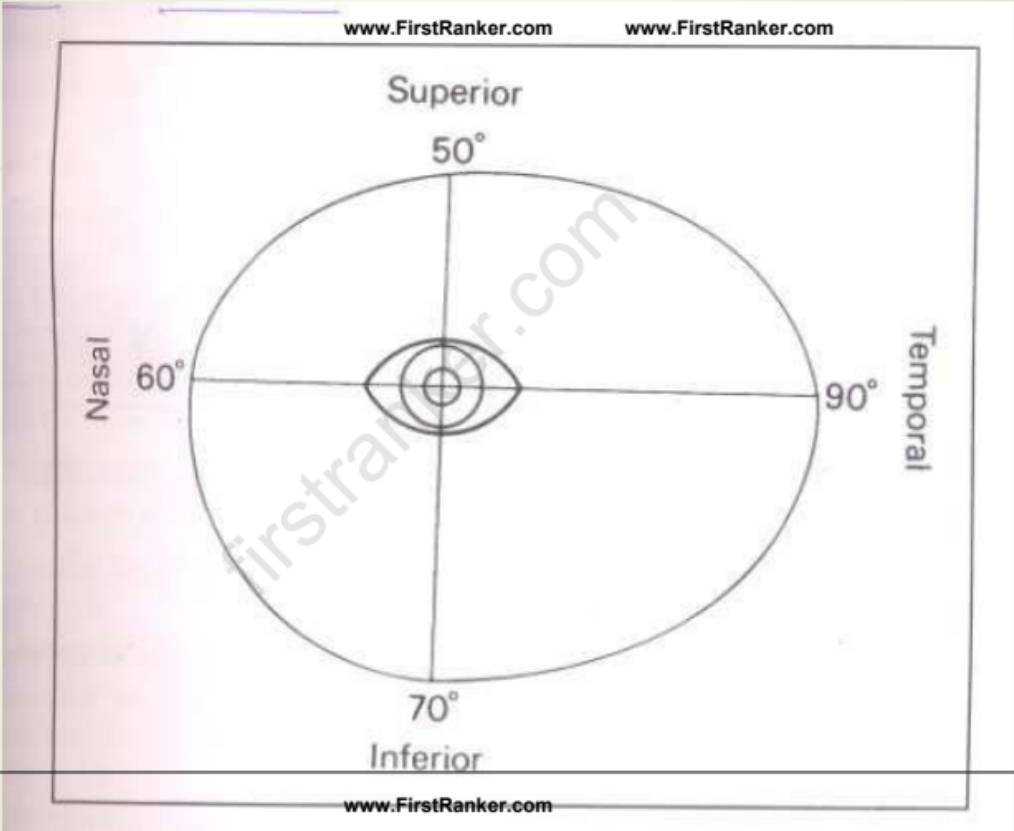
- 1970- Octopus perimeter was first introduced
- 1982 – Humphrey field analyser first displayed at AAO
- 1983 – Michael Patella showed first clinical trial
- 1984 – Became popular

Visual field

- **Visual field is a three-dimensional area of a subject's** surroundings that can be seen at any one time around an object of fixation.
- Traquair described it as an "island of vision surrounded by a sea of darkness"

Island of vision





visual field division

- ▀ central
- ▀ peripheral

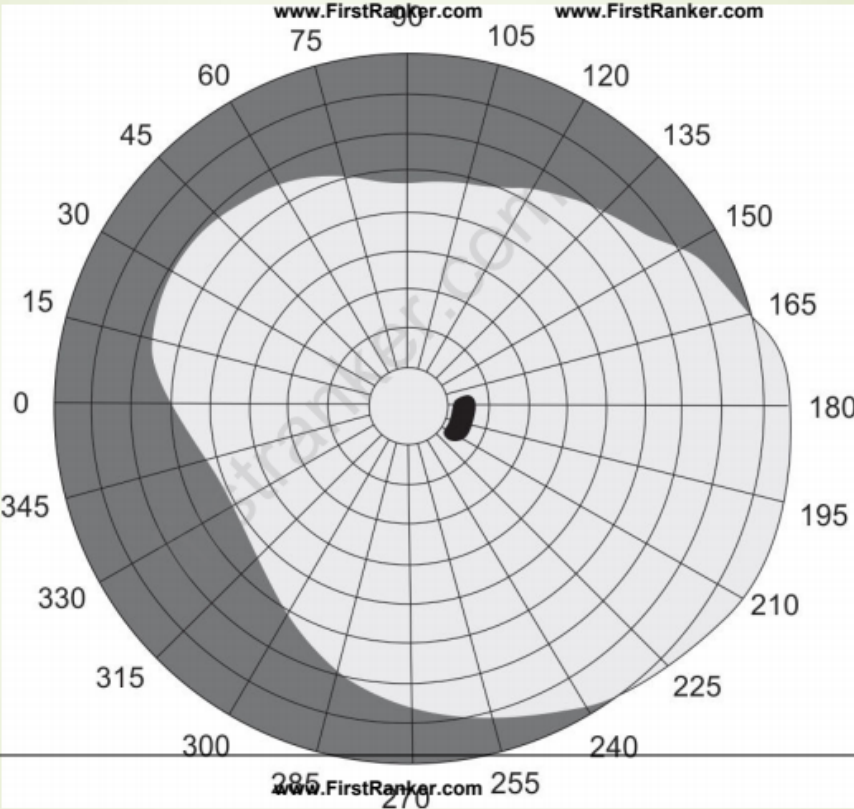
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central

- an area from the fixation point to a circle 30° away.
- The central zone contains physiologic blind spot on the temporal side.

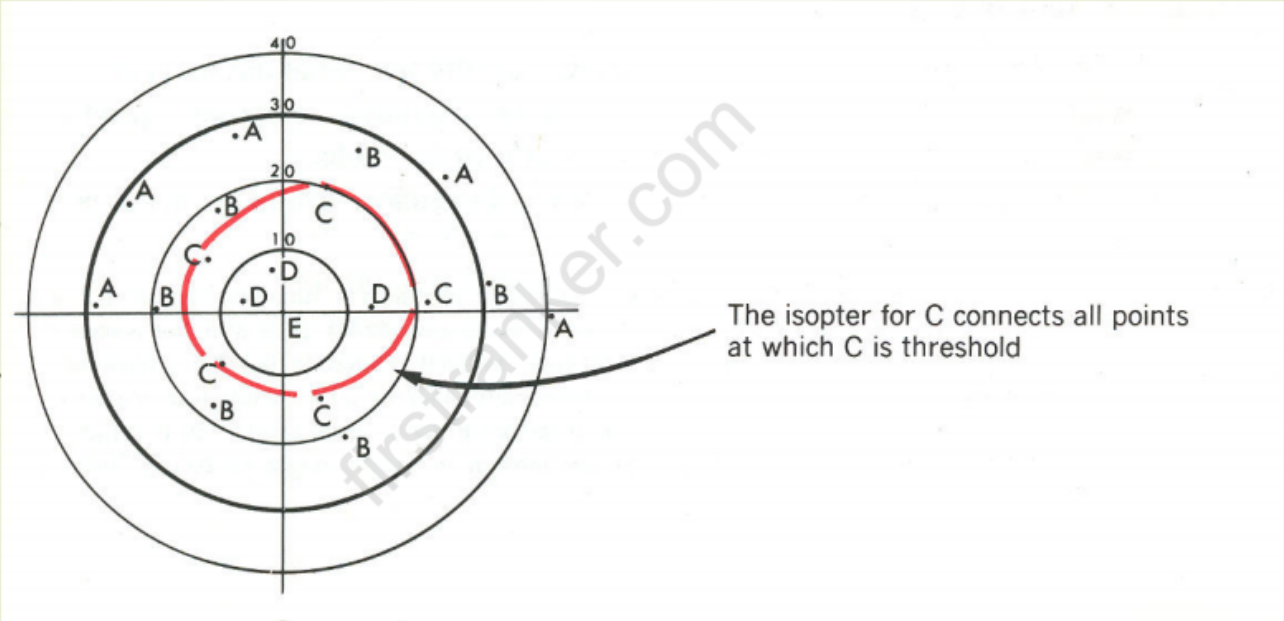
Peripheral field

- The rest of the area beyond 30° to outer extent of the field of vision



Isopter

- a contour line in a representation of the visual field around the points representing the macula that passes through the points of equal visual acuity.
- each isopter can be defined as a threshold line forming points of equal sensitivity on a visual field chart



Scotoma

- an area of loss of vision totally (*absolute scotoma*) or partially (*relative scotoma*) in the visual field.
- It is the depressed part of the field as compared to the surrounding and not as compared to normals.

Perimetry

- *Kinetic versus static perimetry*
- *Peripheral versus central field charting*
- *Manual versus automated perimetry*

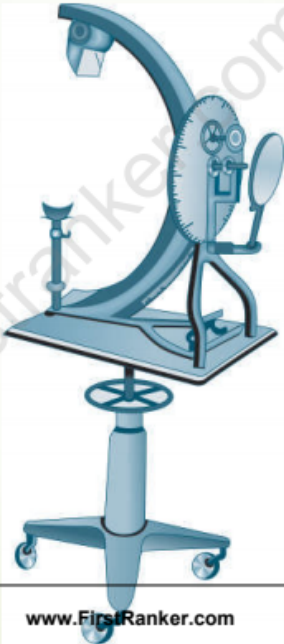
Kinetic

- In this the stimulus of known luminance is moved from a peripheral non seeing point towards the centre till it is perceived to establish the isopters.
- confrontation method
- Lister's perimetry,
- tangent screen scotometry
- Goldmann's perimetry.

confrontation method



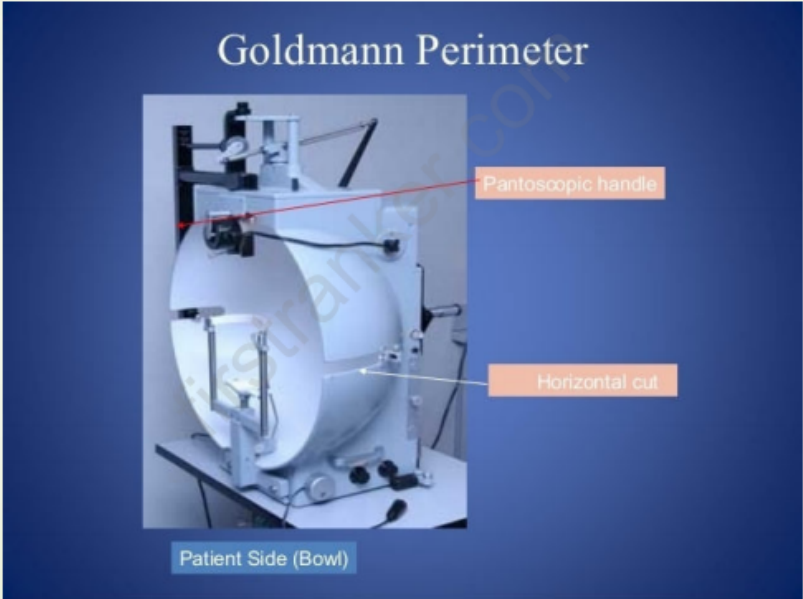
Lister's perimetry



Goldmann's perimetry



Goldmann's perimetry



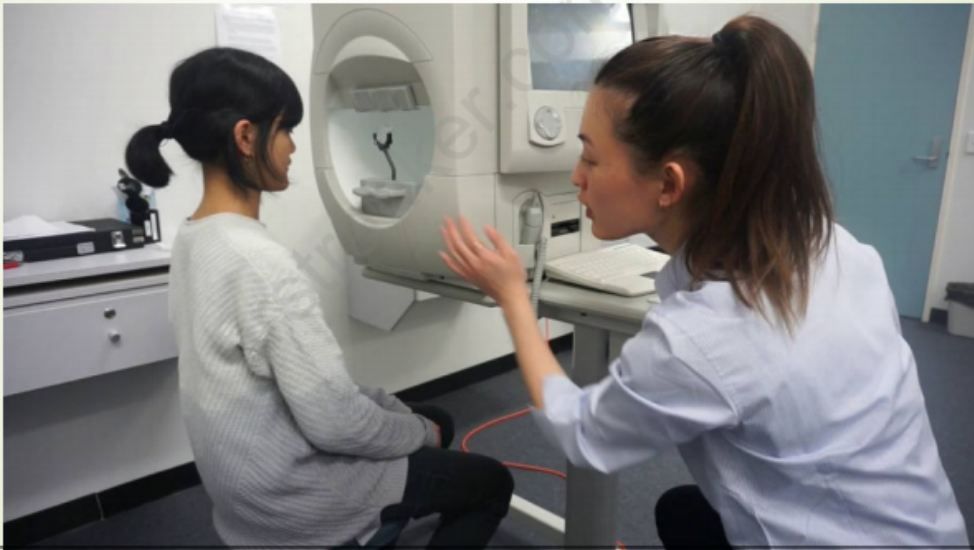
Static perimetry

- This involves presenting a stimulus at a predetermined position for a preset duration with varying luminance in the field of vision
- Goldmann perimetry
- Friedmann perimetry
- Automated perimetry.

Friedmann perimetry



Automated perimetry- Humphrey field analyser



Automated perimetry- octopus field analyser



Peripheral field charting

- Confrontation method
- Perimetry: Lister's, Goldmann's and automated

Central field charting

- ▶ Campimetry or scotometry
- ▶ Goldmann's perimetry
- ▶ Automated field analysis.

MANUAL PERIMETRY

- *Confrontation method*
- *Lister's perimeter*
- *Campimetry (scotometry)*
- *Goldmann's perimeter*

Confrontation method

- This is a rough but rapid and extremely simple method of estimating the peripheral visual field.
- Assuming the examiner's fields to be within the normal range

Confrontation method

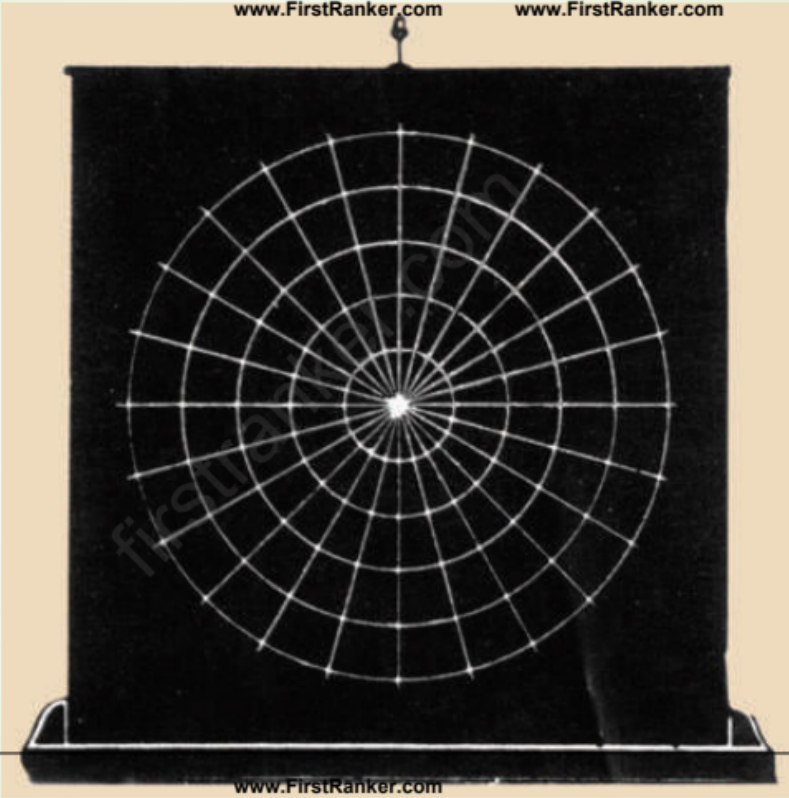
- The patient is seated facing the examiner at a distance of 1 metre. While testing the left eye, the patient covers his right eye and looks into the examiner's right eye. The examiner occludes his left eye and moves his hands in from the periphery keeping it midway between the patient and himself.
- The patient and the examiner ought to see the hand simultaneously, for the patient's field to be considered normal. The hand is moved similarly from above, below and from right and left.

Lister's perimeter

- It has a metallic semicircular arc, graded in degrees, with a white dot for fixation in the centre.

Campimetry (scotometry)

- Bjerrum's screen of either 1 metre or 2 metres square is used
- not used now-a-days



Goldmann's perimeter

- The test conditions and the intensity of the target are always the same.
- It permits greater reproducibility.

AUTOMATED PERIMETRY

- The automated perimeters automatically test suprathreshold and threshold stimuli and quantify depth of field defect
- The problem of subjectivity of perimetrist was eliminated by automation which began in the 1970s
- Automated perimetry improved the uniformity and reproducibility of visual fields

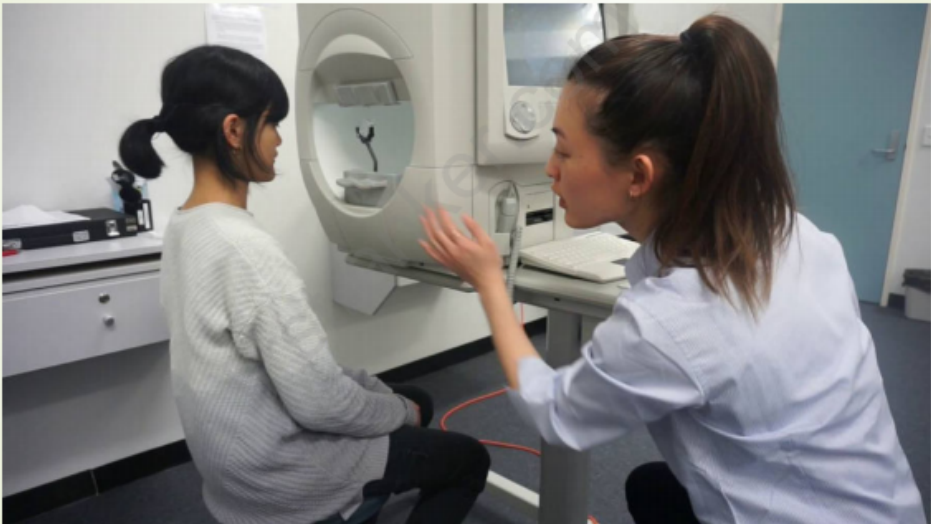
Lister's perimeter

- ▶ Octopus Field Master
- ▶ Humphrey field analyser

Octopus Field Master



Humphrey field analyser



Advantages of automated perimetry

- flexibility, precision and consistency of test method
- data storage capability, ease of operation, well controlled fixation, menu driven software and on line assistance
- compare results statistically
- compare with previous tests of the same individual

Automated perimeter variables

- **Background illumination**
- **Stimulus intensity**
- **Stimulus size**
- **Stimulus duration**

Testing strategies and programmes

- The normal threshold is defined as the mean threshold in normal people in a given age group at a given location in the visual field.
- range of 0–50. 50(db) -dimmest
- 0 db is the brightest illumination.
- the higher the decibel value, the higher is the sensitivity

- Suprathreshold testing
- Threshold testing.

Suprathreshold testing

- targets that are well above the brightness
- screening procedure to detect gross defects
- It should not be used to monitor glaucoma.
- Screening central > 6 points
- Full field 120 points

Threshold testing.

- *Full threshold testing.*
- *Fast Pac*
- *SITA*

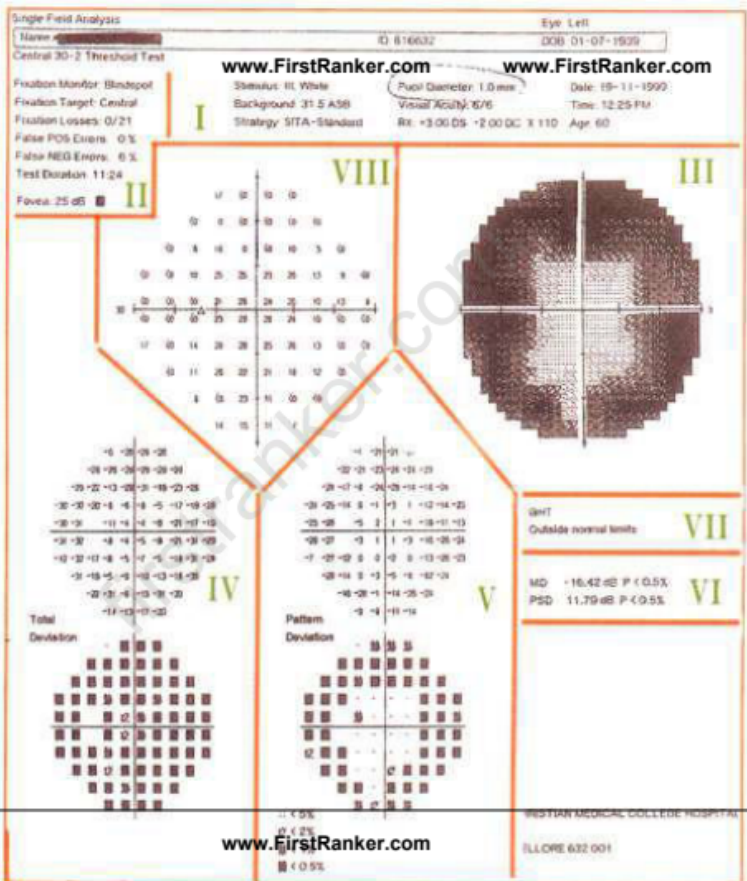
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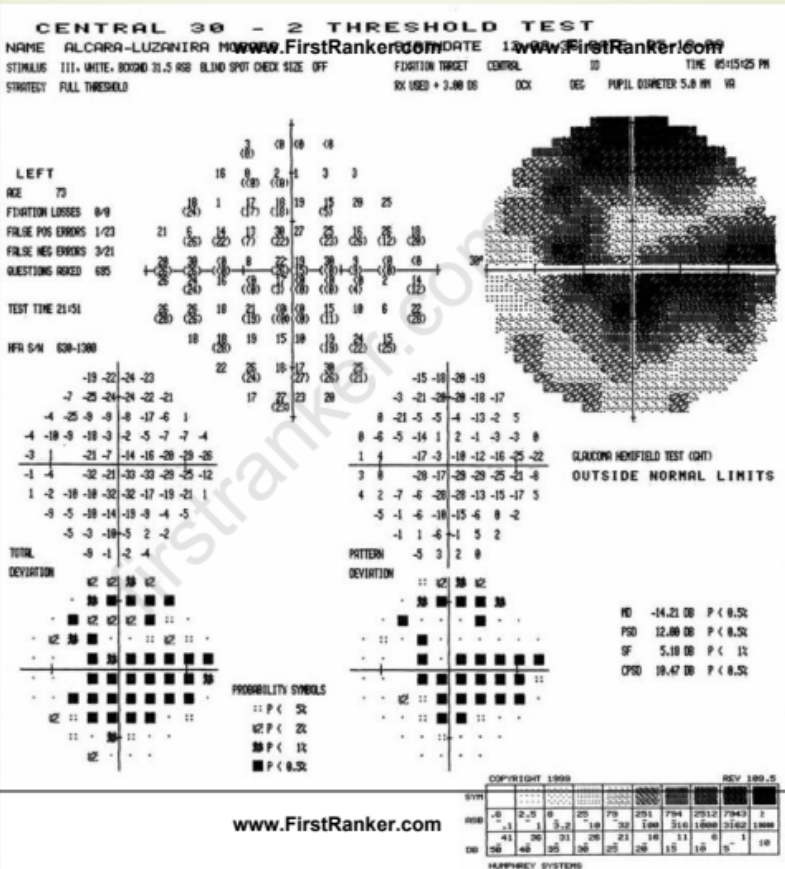
Test programmes -HFA

- Central field tests
- Peripheral field tests
- Speciality tests
- Custom tests

Evaluation of Humphrey single-field Statpac printout

- I. *Patient data and test parameters.*
- II. *Reliability indices.*
- III. *Gray scale simulation*
- IV. *Total deviation plots*
- V. *Pattern deviation plots.*
- VI. *Global indices*
- VII. *Glaucoma hemifield test (GHT)*
- VIII. *Actual threshold values*





I. Patient data and test parameters.

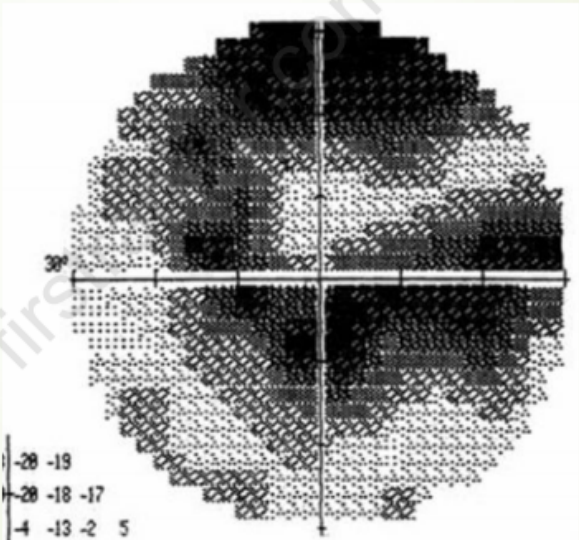
- *Patients data (name, date of birth, eye (right/left) pupil size, visual acuity).*
- *Test parameters (test name, strategy, stimulus used, background).*

II. Reliability indices.

- reliability indices and test duration
- Unreliable if three or more of the following reliability indices have below mentioned values:
 - • Fixation losses > 20%,
 - • False positive error > 33%,
 - • False negative error > 33%,
 - • Short-term fluctuations > 4.0 dB,
 - • Total questions > 400.

III. *Gray scale simulation*

- The darker the printout, the worse is the field
- do not make a diagnosis based on the grey scale



IV. Total deviation plots

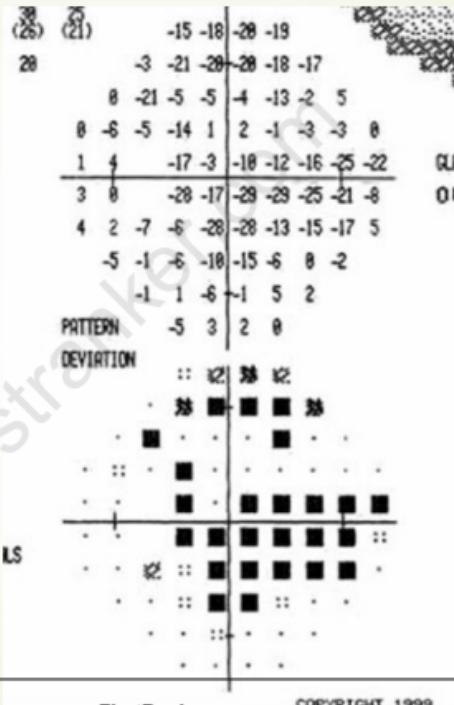
- ▶ provide the deviation of patient's threshold values from that of age corrected normal data.
- ▶ • *Numeric value plot represents the differences in decibels.*
- ▶ • *Zero value means that the patient has the expected threshold for that age.*
- ▶ • *Positive numbers reflect points that are more sensitive than average for that age; whereas*

- • *Negative numbers reflect points that are depressed compared with the average.*
- • *Probability plot (grey scale symbol plot). In the lower half of part of zone IV of the printout, the darker the graphic representation the more significant it is.*

[illegible]

V. Pattern deviation plots.

- *numeric pattern deviation plot and probability pattern deviation plot*
- Statpac software has corrected the results for the changes caused by –
- Cataract, small pupil, refractive error, etc

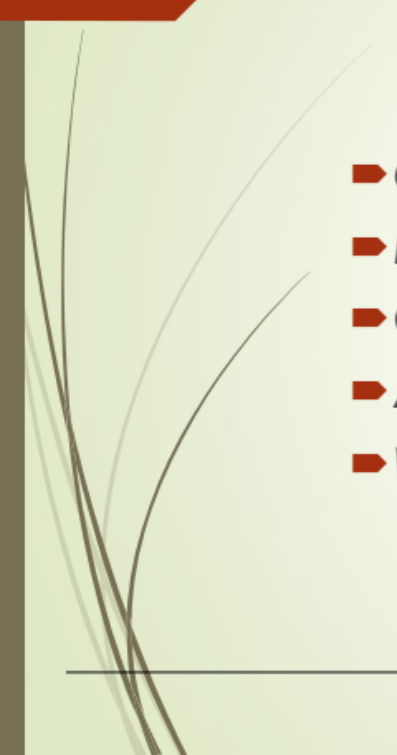


VI. *Global indices*

- To provide overall guidelines to help the practitioner assess the field results as a whole rather than on point-to-point
- 1. *Mean deviation (MD).*
- 2. *Pattern standard deviation (PSD).*
- 3. *Short-term fluctuation (SF).*
- 4. *Corrected pattern standard deviation (CPSD).*

VII. *Glaucoma hemifield test (GHT)*

- compares the five clusters of points in the upper field (above the horizontal midline) with the five mirror images in the lower field.

- 
- **Outside normal limits.**
 - **Border line.**
 - **General reduction in sensitivity**
 - **Abnormally high sensitivity**
 - **Within normal limits.**

VIII. *Actual threshold values*

- ▶ may be inspected for any pattern or scotoma when clinical features are suspicious
- ▶ even if all the seven other parts of the printout are normal

