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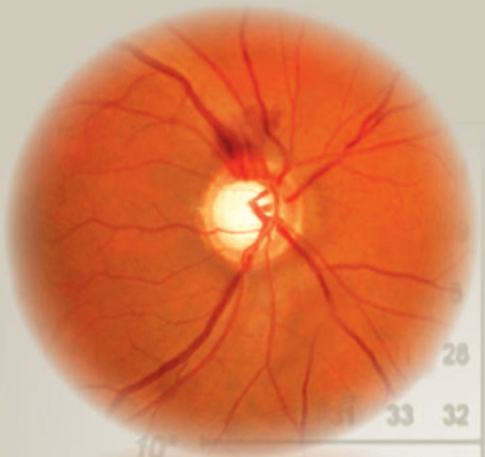

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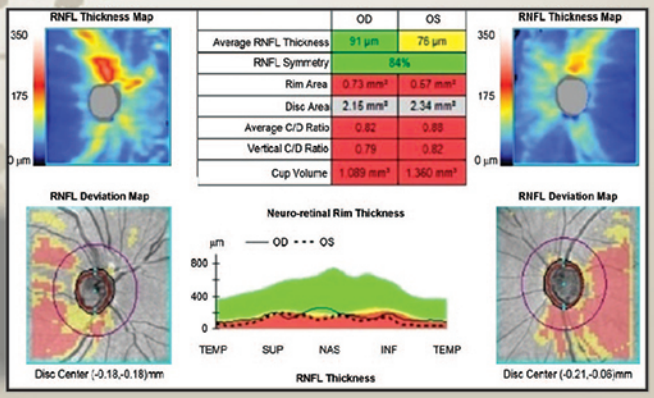
Practical Guide to Interpret Visual Fields

GR Reddy

Co-Author
G Jayamadhury



Foreword
R Ramakrishnan

FOURTH EDITION

JAYPEE

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CHAPTER

2

Fundamentals of Automated Perimetry

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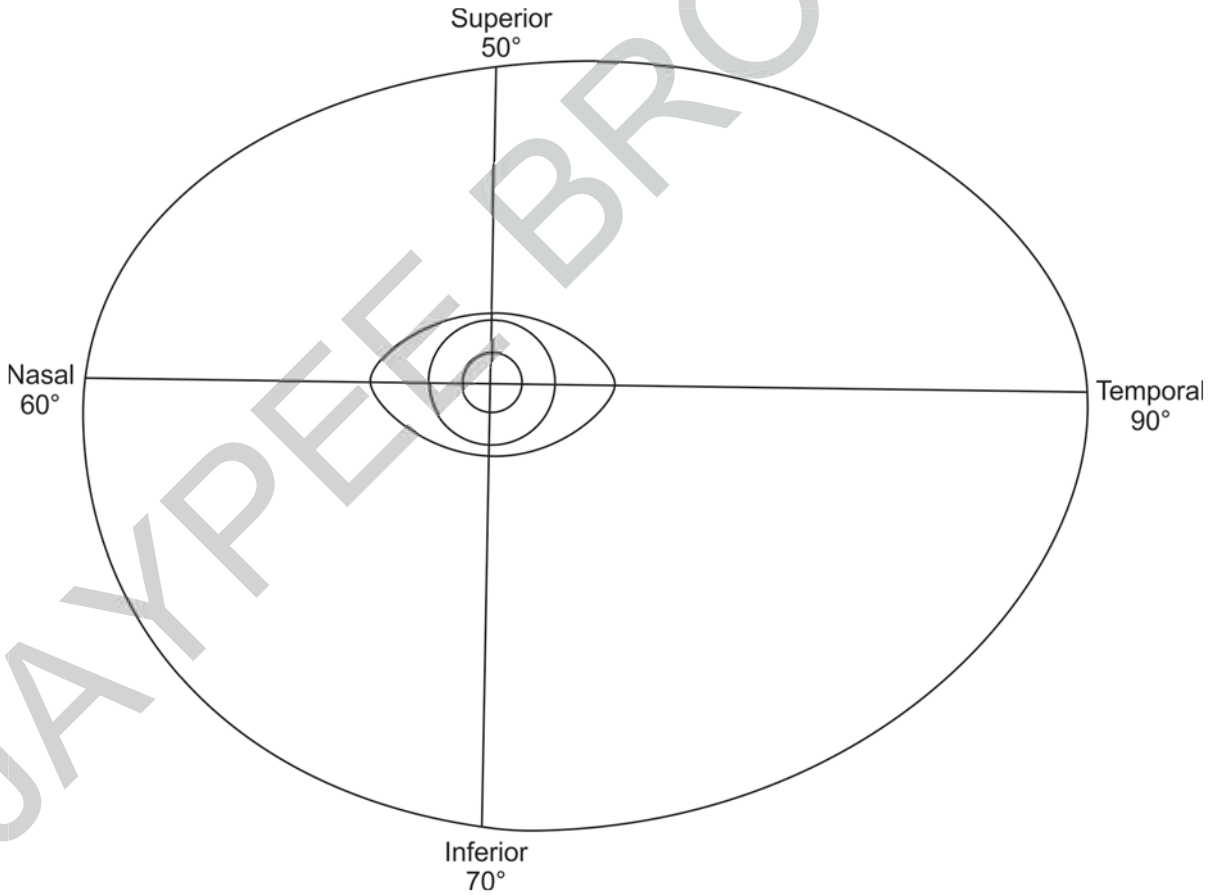
DEFINITION OF VISUAL FIELD

The visual field is defined as that part of the environment that is visible to the steadily fixing eye. The extension of visual field is as follows:

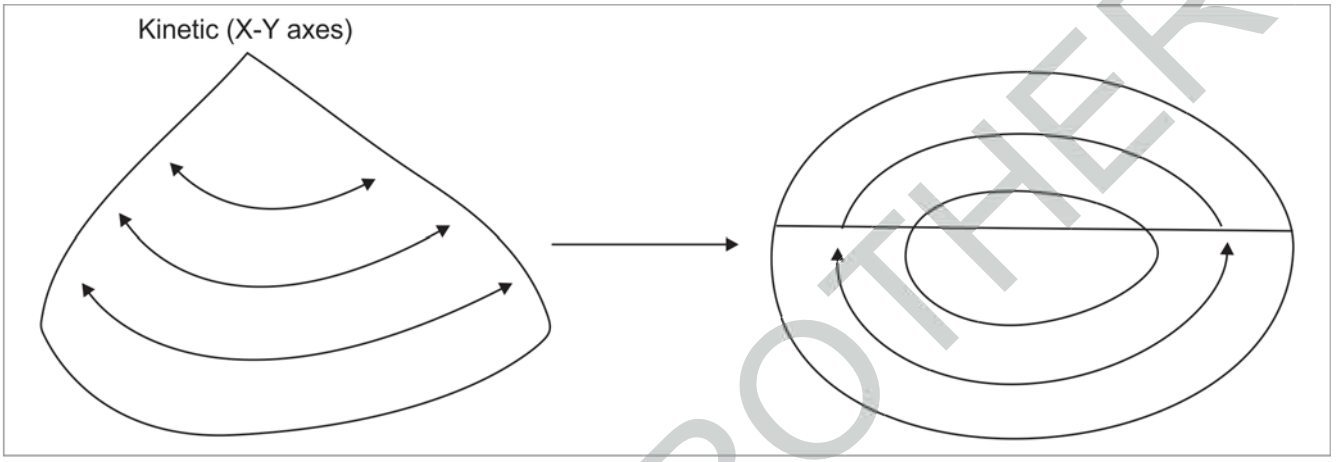


The functional boundaries of normal visual field approximate a spiral; 50° above, 60° nasally, 70° below and 90° temporal.

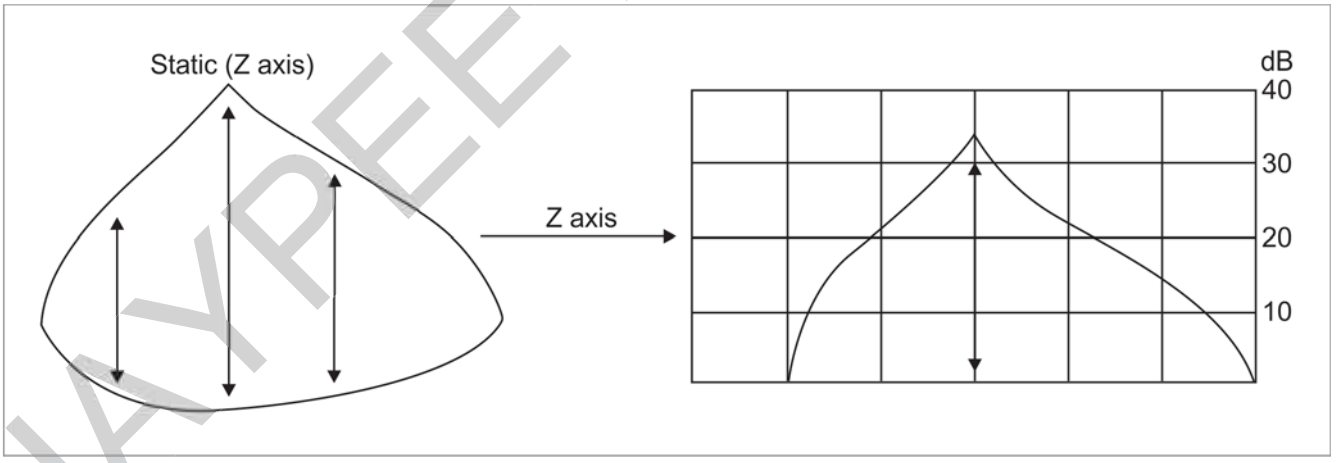
MEASUREMENT OF VISUAL FIELDS

The visual field is three-dimensional and is measured in two ways:

1. **Kinetic perimetry**
2. **Static perimetry**



When the island hill of vision is kinetically explored along the X-Y axis (i.e. a plane parallel to the surface of the sea), the locations of points with the same threshold are identified; these are isopters.



When the island hill of vision is statically explored along the Z axis (i.e. in a plane perpendicular to the surface of the sea) the varying points of sensitivity are identified; these are the thresholds displayed as meridional cut.

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KINETIC PERIMETRY

Measuring along X-Y axis, the border of the visual field is outlined when the object is moved from a non-seeing area to seeing area.

Disadvantages

Kinetic tests are suprathreshold and are not always reproducible and are highly dependent on skill of the technician. Early or subtle changes may be overlooked.

STATIC PERIMETRY

The main aim of static perimetry is to find out the threshold of retina at various fixed points. Static perimetry is a technique where the patient looks at a small fixation point, located at the center of a white hemispherical bowl and the light stimuli are briefly presented at fixed stationary locations usually for about 200 milliseconds duration. The patient presses a response button when the stimulus is detected. Usually the factors affecting the stimulus visibility are stimulus size, background illumination and brightness of the stimulus. In static perimetry the size of the stimulus and the background illumination remain constant, the light intensity is varied according to a staircase (bracketing) procedure to define the minimum intensity necessary for the detection of stimulus.

Size of the stimulus: The standard stimulus size for all perimeters is Goldmann size III. The size of the stimulus can be changed depending on the clinical conditions. The size III can be changed to size V in case of macular disorders and advanced glaucoma. Please note that during the entire test period, the size of the stimulus whether it is size III or size V will remain constant along with the background illumination while, the intensity of light stimulus varies.

Background illumination: The background illumination is not the same for all perimeters. The background illumination for different field analyzers are shown **below.**

Octopus 101	Octopus 1-2-3	Humphrey 700	Dicon
4 asb (1.27 cd/m^2)	31.4 asb (10 cd/m^2)	31.5 asb (~10 cd/m^2)	31.5 asb (~10 cd/m^2)

The stimulus intensity is varied by the use of attenuation filters. The attenuation of light is expressed in logarithmic unit and is more commonly in tenths of log units which are known as decibel (dB). 1 decibel = 1/10 log unit of attenuation of maximum available stimulus. (10000 asb units for the current Humphrey perimeters). The maximum and minimum intensities of light projected by each perimeter vary. The maximum intensity of light projected by Humphrey field analyzer is 10,000 asb units and 4000 asb units for octopus 1-2-3. The minimum intensity of light projected by Humphrey field analyzer is 0.1 asb unit and 0.4 asb unit is for octopus 1-2-3 model. The change in the stimulus intensity will be discussed in detail when we talk about the units used to express light intensity and retinal sensitivity later in this chapter.

Automated static perimetry uses a standardized test procedure which ensures that testing is performed in a unified manner from one time to another and one location to another. Because a standard test procedure is used, databases of normal values for individuals of all ages have been established for automated static perimetry. This allows the examiner to compare an individual's test results to age adjusted normal population characteristics, to identify whether various locations are within normal sensitivity limits or whether they are outside normal limits by a specific amount. However, the normative database does not include all ethnic groups.

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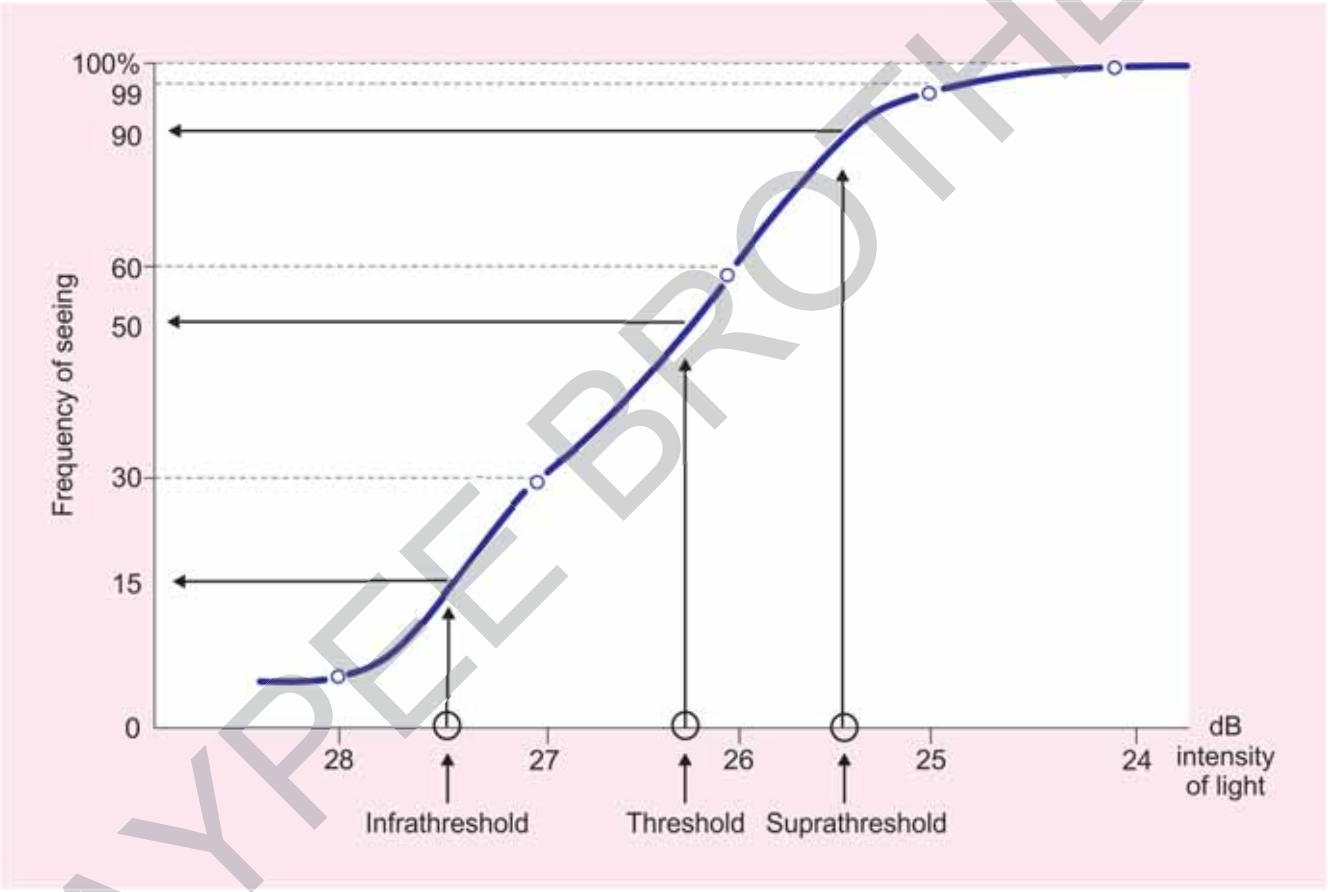
THRESHOLD

Definition

Threshold for a given point is defined as that stimulus intensity which has a 50% probability of being seen. If light of a particular intensity is shown 100 times and if it is appreciated 50 times, that particular intensity of light is termed as threshold for that given point. If the stimulus intensity is seen >50% of times it is termed as suprathreshold and if it is seen < 50% of times, it is termed as infrathreshold. This is clearly shown in this below figure of frequency of seeing curve, the X axis represents the intensity of light in dB values and the Y axis represents the percentage of frequency of seeing.



The most important point to be noted in this figure is as the dB value decreases, the light intensity increases.

From the frequency of seeing curve it is very clear that if a light intensity of around 27 dB is projected 100 times, it is appreciated 15% of the time indicating that the light intensity of around 27 dB is infrathreshold value of that point. If the light intensity of around 26 dB is projected 100 times, it is appreciated 50% of the times indicating that the light intensity of around 26 dB is the threshold value of that point. If the light intensity of around 25 dB is projected 100 times, it is appreciated 95% of the times indicating that light intensity of around 25 dB is the suprathreshold value of that point.

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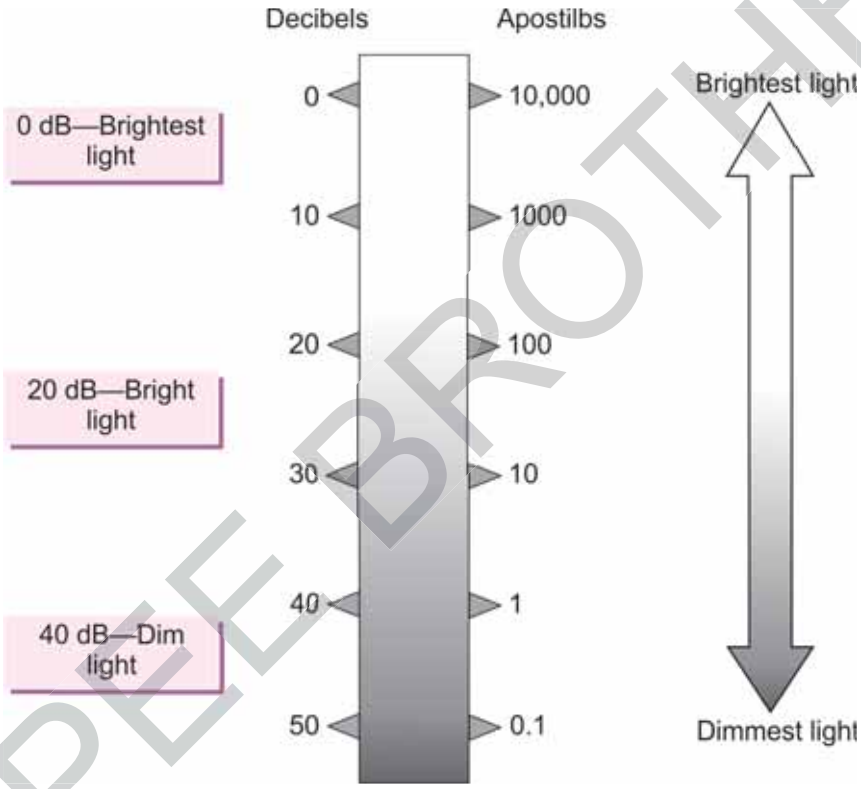
Units are Used to Express Light Intensity and Retinal Sensitivity

Apostilbs (asb units) are the fundamental units used to express light intensity. Apostilbs are converted to decibel (dB) units to express light intensity and retinal sensitivity. The brightness of the stimulus is attenuated by the use of filters in field analyzer. If there is no attenuation of light intensity, it is labeled as 0 decibel. So by convention the maximum intensity of stimulus is assigned a value of 0 decibel (which means there is no attenuation of light). The maximum intensity of light projected by Humphrey field analyzer is 10,000 Asb units. So in Humphrey field analyzer '0' dB value = 10,000 Asb units. The minimum intensity of light projected by Humphrey field analyzer is 0.1 Asb units. So in Humphrey field analyzer '50'dB value = 0.1 Asb units.



Apostilbs are absolute units of light intensity (100 asb intensity on one instrument is same as 100 asb intensity on another instrument). In contrast, the decibels are relative units. That means the decibel value depends on the maximum intensity projected by each perimeter.

As the brightest light projected by each perimeter varies, the dB value also varies. So decibel units are not absolute units but are relative units to express light intensity. For example, on Goldmann perimeter, the maximum light intensity is 1000 asb and 10 dB attenuation results in 100 asb light intensity. On Humphrey perimeter, the maximum intensity of light is 10,000 asb and 10 dB attenuation results in 1000 asb light intensity. Thus the 10 dB stimulus on Goldmann perimeter which is equal to 100 asb units is not the same intensity as a 10 dB stimulus on Humphrey field analyzer, which is equal to 1000 asb units. But 10 dB does represent the same percentage reduction from maximum intensity in both the instruments. The conversion from asb units to decibels is logarithmic and not a simple multiplication factor.

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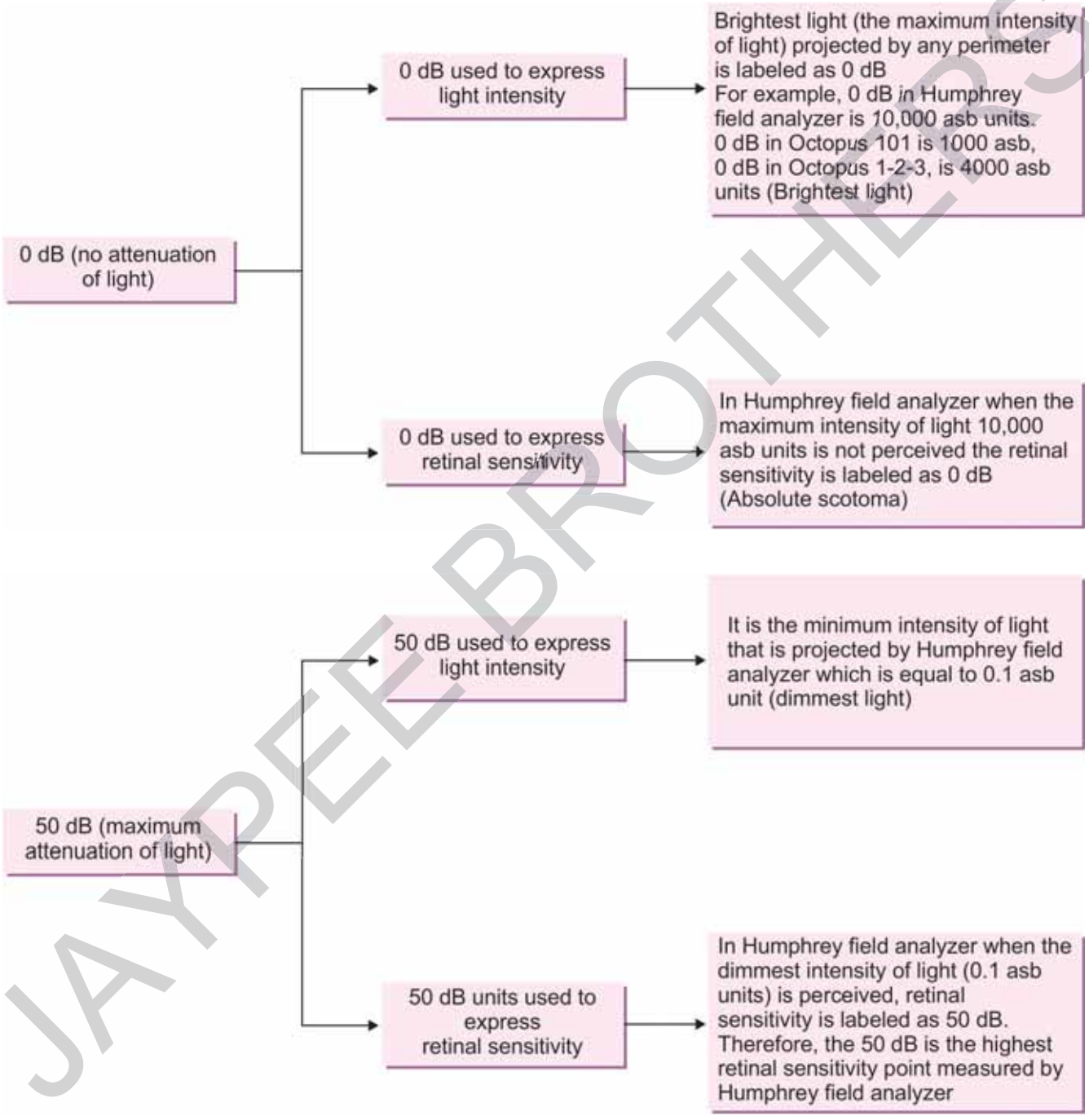
Decibel (dB) units are used to express both the light intensity and retinal threshold value.



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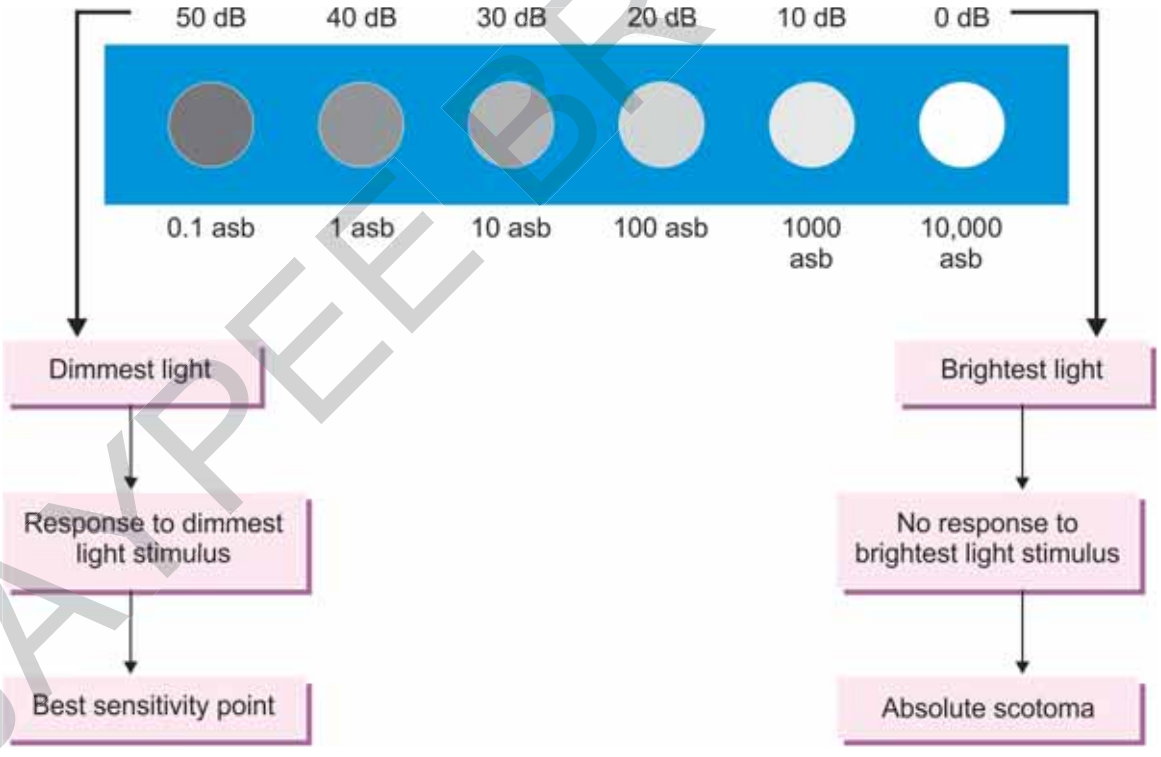
The asb units when used to express light intensity

High asb value denotes bright light and low asb value denotes dim light. Thus light intensity is directly proportional to asb value.

The asb units when used to express retinal sensitivity

If higher light intensity is required to get the response, it indicates the retinal sensitivity is low. As described above higher asb units represent bright light. Thus higher the asb units indicates that the retinal sensitivity is low. Thus retinal sensitivity is inversely proportional to asb units. The main disadvantage of expressing the retinal sensitivity in asb units is it's inversely proportional relation. When the maximum light intensity of 10000 asb units in Humphrey field analyzer is not perceived then the retinal sensitivity should be labeled >10000 asb; which denotes an absolute scotoma. Similarly the retinal sensitivity with a positive response to minimum light intensity of 0.1 asb unit should be labeled 0.1 Asb. Absolute scotoma is represented by 10,000 asb units and best sensitivity point is represented by 0.1 asb unit.

If we say the retinal sensitivity is >10,000 asb units, it gives impression as if the sensitivity is the best. But in real sense, it is an absolute scotoma. This is one of the reasons why asb units are not used for retinal sensitivity and they are converted to dB units. The main advantage of expressing retinal sensitivity in dB units is that the retinal sensitivity is directly proportional to dB value.



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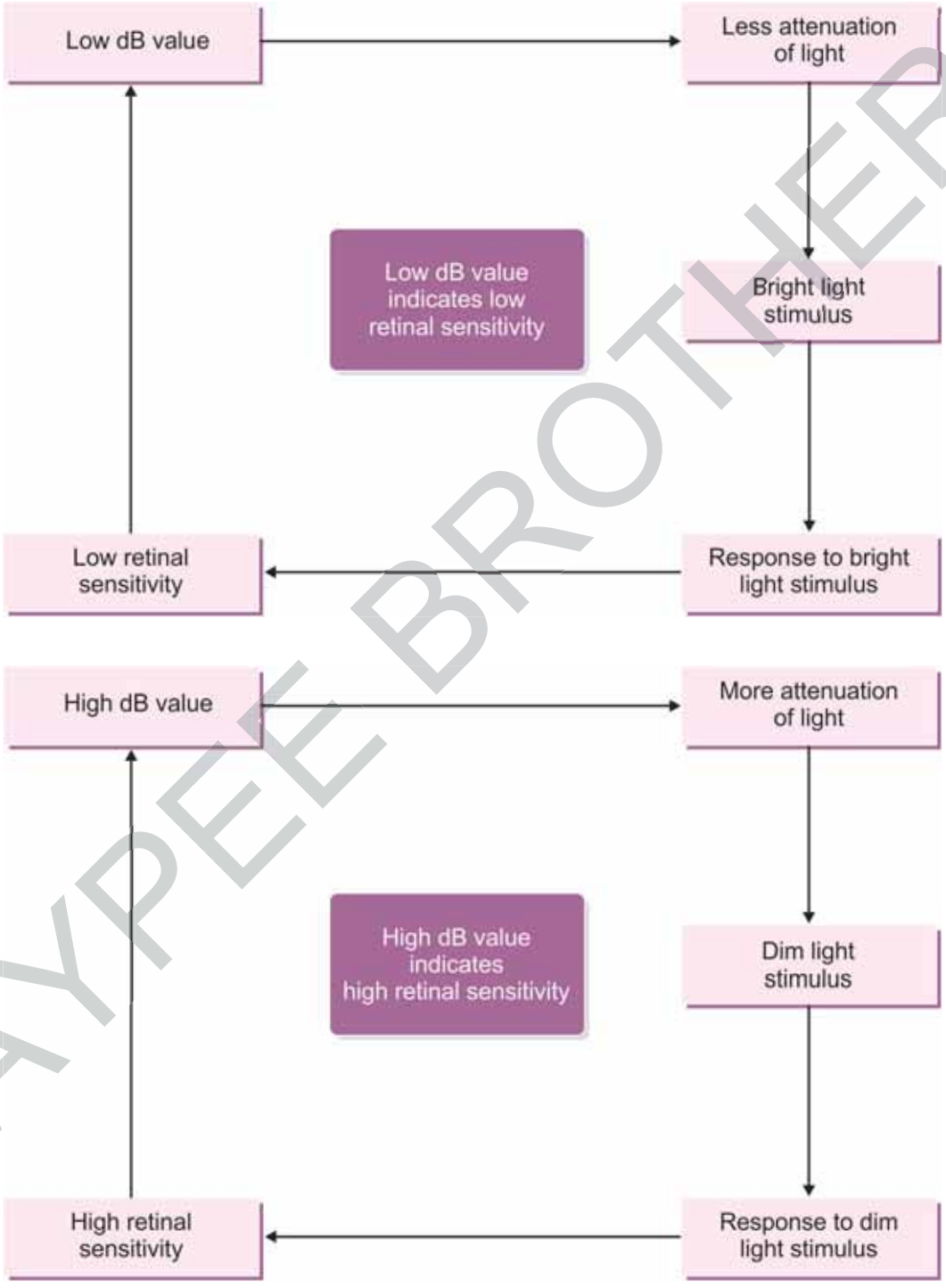
The most important point to be noted is that the dB units represent both the light intensity and the retinal threshold value.



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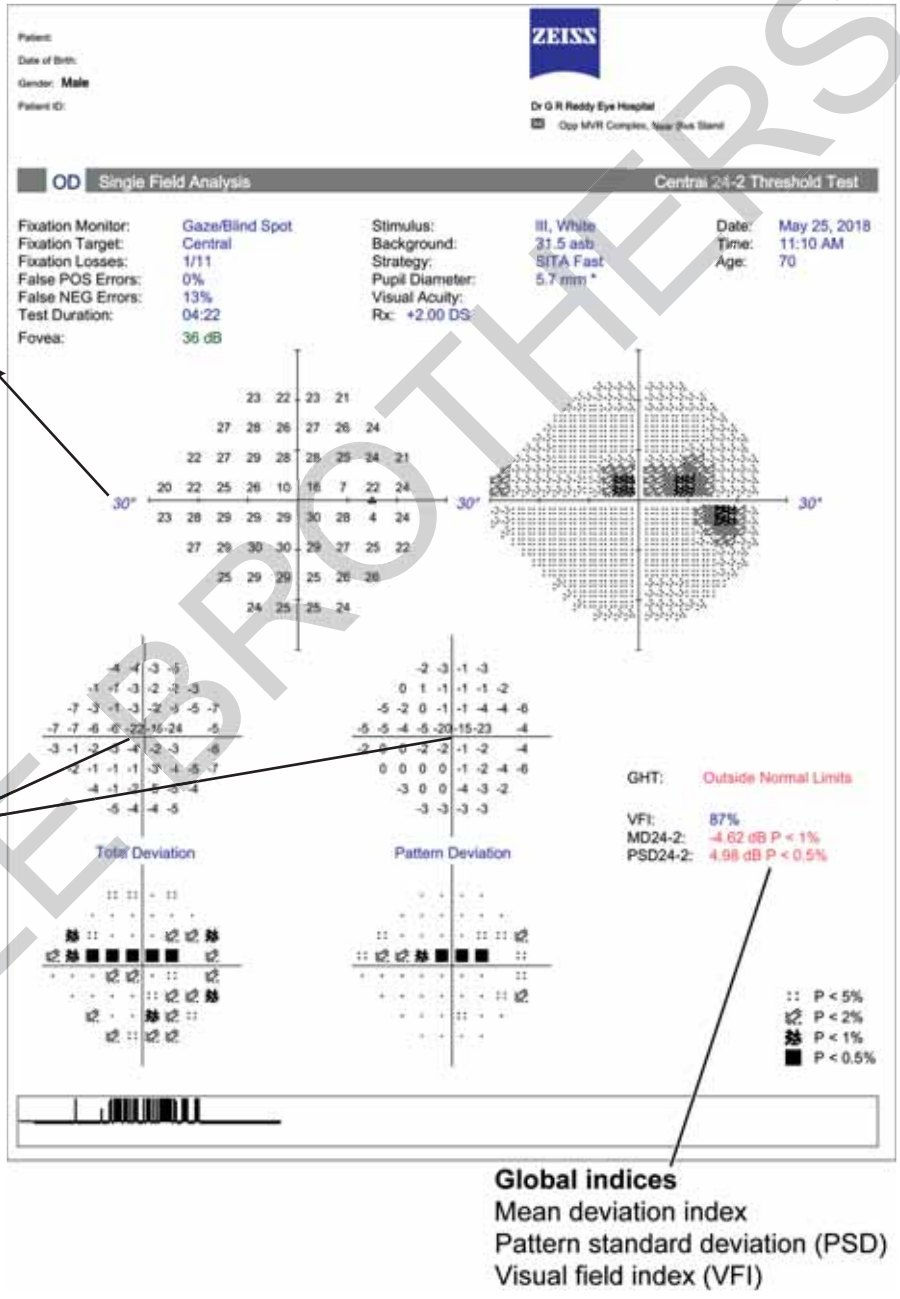
The retinal threshold value and its derivatives are expressed in dB units in all the visual field printouts.

Raw data:

The retinal sensitivity is expressed in dB units instead of asb units. To express retinal threshold values in asb units more space is needed. For example, a point with threshold value of 10 dB units has to be represented 1000 asb units. In order to avoid large numbers, retinal threshold value is expressed in dB units instead of asb units. Another advantage of expressing retinal sensitivity in dB units is that the retinal sensitivity is directly proportional to dB value.

Total and pattern deviation numerical plots:

The deviation values from normative data are expressed in dB units with no sign or (–) sign in front of each number.



To understand visual field printouts, one should have a very good concept on dB units. dB units are used to measure both retinal sensitivity and light intensity.

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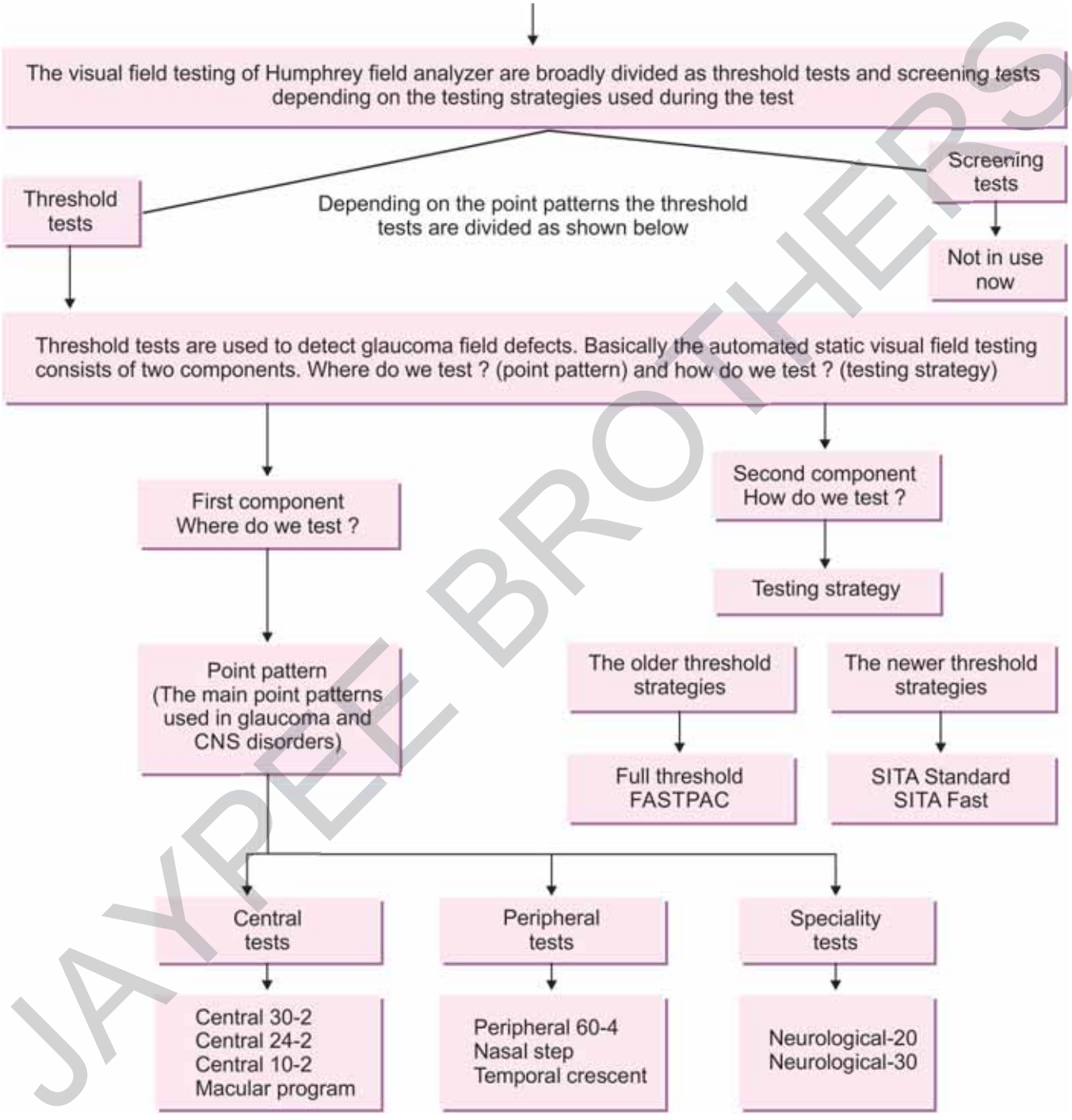
Classification of Humphrey Visual Field Tests



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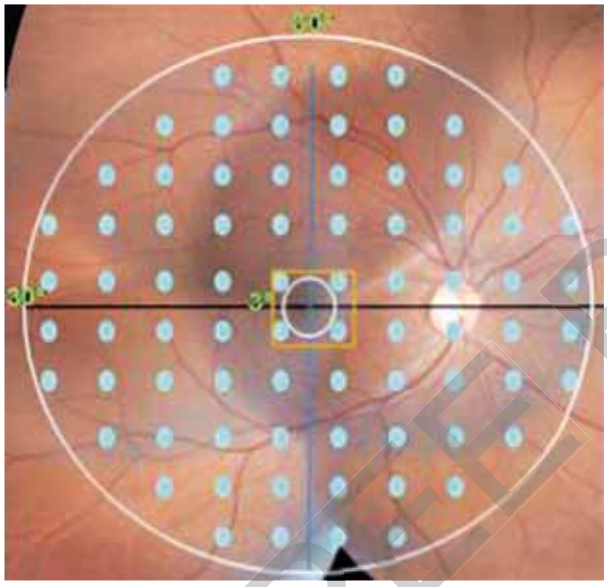
For example, the selected test is central 30-2 Swedish Interactive Threshold Algorithm (SITA) Standard. In this test the first component (point pattern) is central 30-2 and the second component (testing strategy) is SITA Standard. Now the point patterns and the testing strategies are discussed in detail.

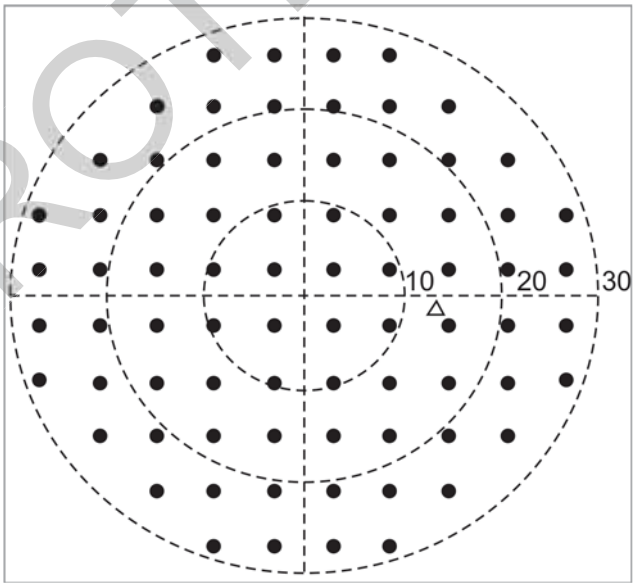
POINT PATTERNS

Point patterns used for glaucoma are 30-2, 24-2, 10-2 and macular program. It was thought that 30-2 and 24-2 are for early and established glaucomas and 10-2 is for advanced glaucoma. Currently this concept has been changed as we are seeing good number of primary open-angle glaucoma (POAG) cases which start within the 10° circle area. The concept of 10-2 point pattern being reserved for advanced glaucoma no longer holds good. However 30-2 and 24-2 are selected in a suspected or established case of glaucoma. Selecting 10-2 point pattern depends on the sensitivities of the 16 points in the 10° circle area of 30-2 or 24-2 single field analysis (SFA) printouts and the direction of the retinal nerve fiber layer (RNFL) defect. If RNFL defect directs towards macula, 10-2 point pattern is selected even if 30-2 or 24-2 single field analysis printout shows early or no glaucomatous field defect.

30-2 Point Pattern



30-2 point pattern



30-2 central field

- 30° represents the extent of the field being tested with fovea as center.
- 2 represents that no points are present on vertical and horizontal axis.
- The distance between each point is 6° and the distance between point and the center of fixation is 3°.
- 76 points are distributed in this entire area including the two points on the blind spot.
- The 3° circle around the center of fixation; which does not have any points is the bare area of 30–2 or 24-2 point pattern.

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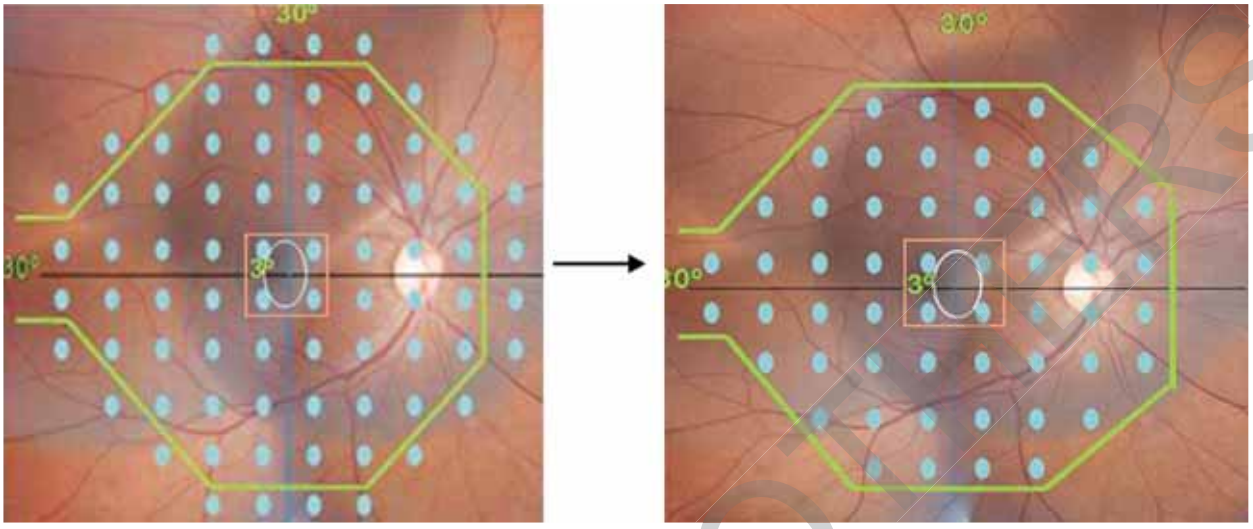
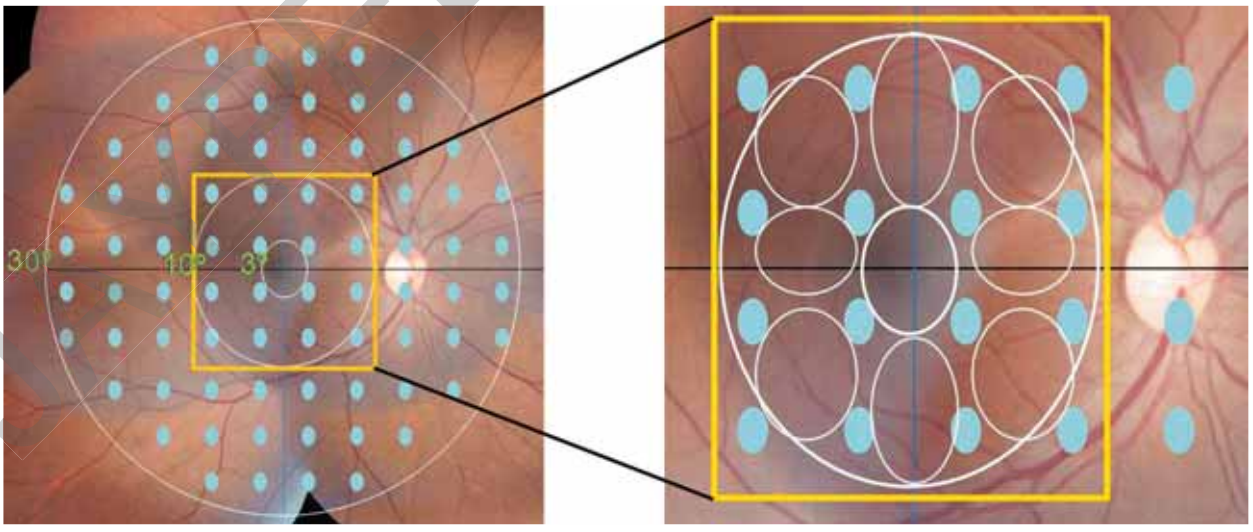
24-2 Point Pattern



30-2 point pattern

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 24-2 point pattern. So the total points of 24-2 point pattern (76–22 = 54) will be 54 points. 24-2 pattern is nothing but the 54 points of 30-2 which are present within 24° circle area from the fixation point. Because of this reason, the results from 30-2 and 24-2 may be presented on one sheet in the overview printouts. But note that the two outer most points on the nasal side are 27° from the fixation point. So strictly speaking it is actually not 24-2 point pattern because the two nasal points on either side of horizontal axis are at 27° from fixation point (the two points on the outer circle 30-2).



30-2 point pattern

10° circle area of 30-2 or 24-2

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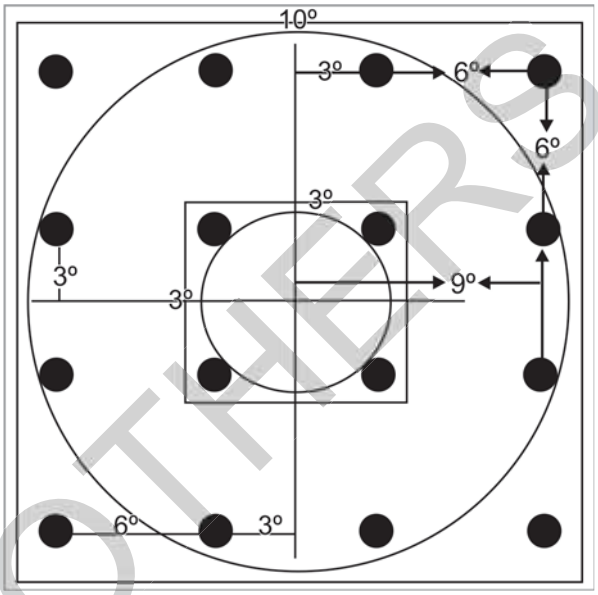
10° Circle Area of 30-2 or 24-2

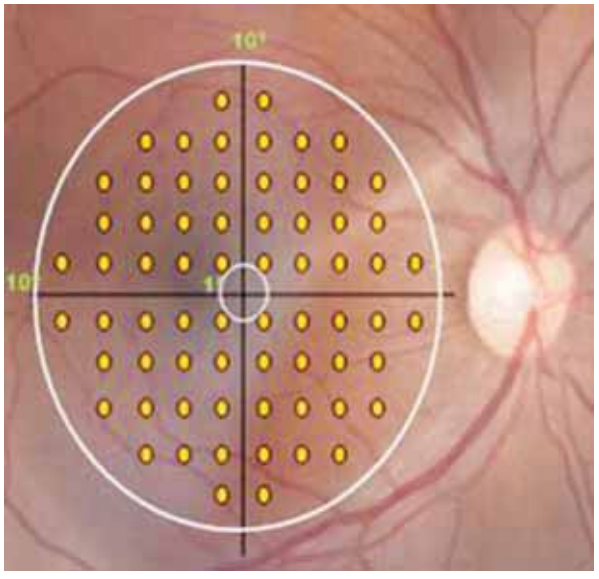


The 10° circle area of 30-2 or 24-2 contains two set of points. The outer set of points are related to 9° circle. They are 12 in number. The inner set of points are related to 3° circle. They are 4 in number. The total number of points in the 10° circle area of 30-2 or 24-2 are 16 points. The distance between each point is 6° and the distance between point and the axis is 3°. Concentrate on the sensitivities of these 16 points within the 10° circle area of 30-2 or 24-2. There are no points within 3° circle around the fixation point. Hence 30-2 and 24-2 point patterns are not suitable to assess foveal split. We always talk about the bare area of 3° circle around the fixation point in 30-2 and 24-2 point patterns.

But there is a huge bare area between the 3° circle points and 9° circle points of 30-2 or 24-2 point pattern. If glaucomatous damage occurs in this bare area, it will be missed in 24-2 or 30-2 point patterns. Significant loss of retinal sensitivity at any of these 16 points in 10° circle area of 30-2 or 24-2 point patterns is an indication to repeat the test with 10-2 point pattern and this aids in detecting glaucomatous damage at an earlier stage.

10-2 Point Pattern

1. **In 10-2 Point pattern-10** represents extent of testing area (10° radius circle with fovea as center) and 2 represents that there are no points on both the horizontal and vertical axis. (In 10-1 point pattern points are present on both the horizontal and vertical axis. The 10-1 point pattern is not in use now).
2. The distance between point to point is 2°.
3. The total number of points are 68 points in 10-2 Point pattern (The 10° circle area of 30-2 or 24-2 contains 16 test points).
4. In this point pattern the bare area around the fixation target is 1° radius of a circle because the distance between the point to the center of fixation is 1°.



10-2 point pattern

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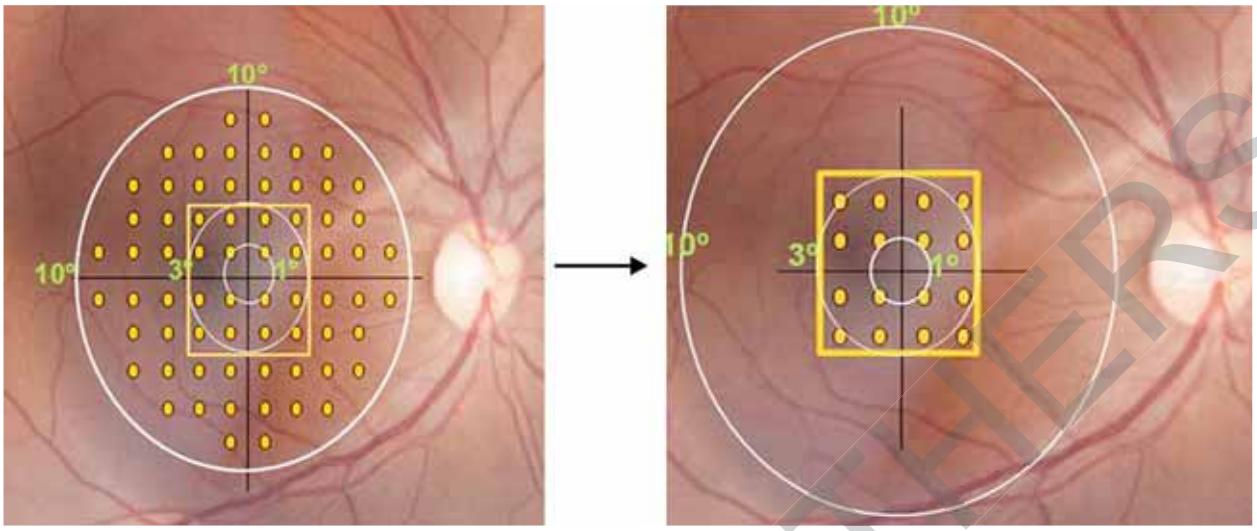
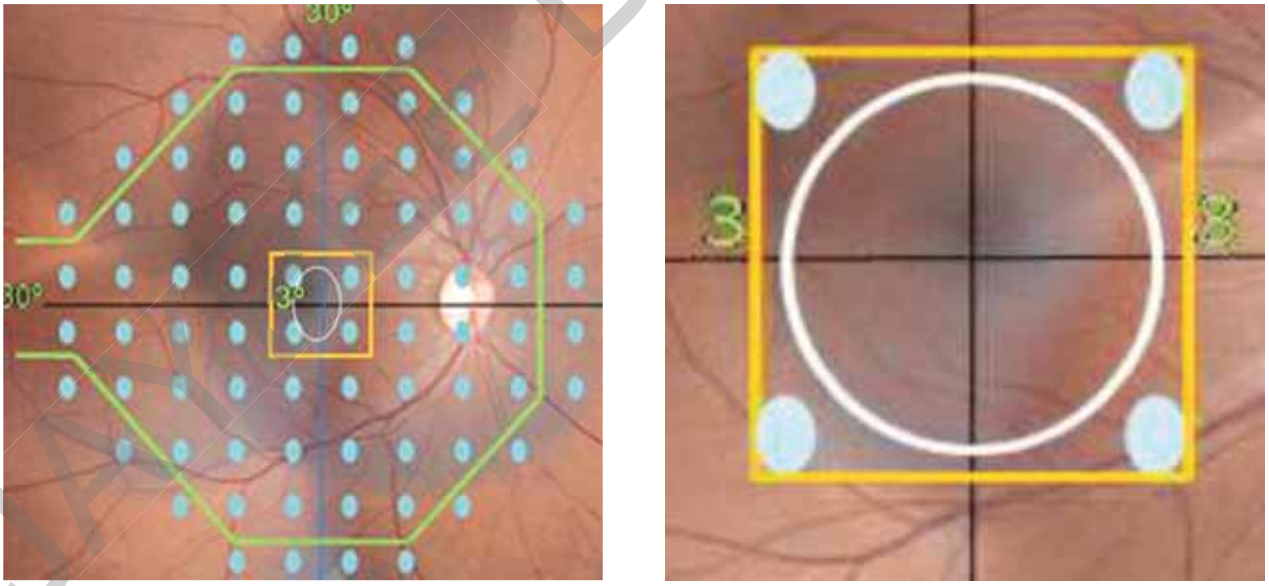


10-2 point pattern **Macular program**

The outer 3 sets of points of the 10-2 point pattern are eliminated to form the macular point pattern. Macular program has 16 central points of 10-2 which are present within 3° radius of a circle from fixation point. In this point pattern the bare area around the fixation spot is 1°. In advanced cases of glaucoma to assess the foveal status and to comment on macular split, macular program with stimulus size 111 or V can be ordered.



30-2 point pattern **Bare area of 30-2 or 24-2 point pattern**

The 3° circle around the center of fixation; which does not have any points in the bare area of 30-2 or 24-2 point pattern. As there is 3° circle bare area around the center of fixation; in the 30-2 or 24-2 point patterns, the foveal status should not be commented. Depending on the sensitivities of the 16 points in the 10° circle area, we should repeat the test with 10-2 point pattern to know the foveal status.

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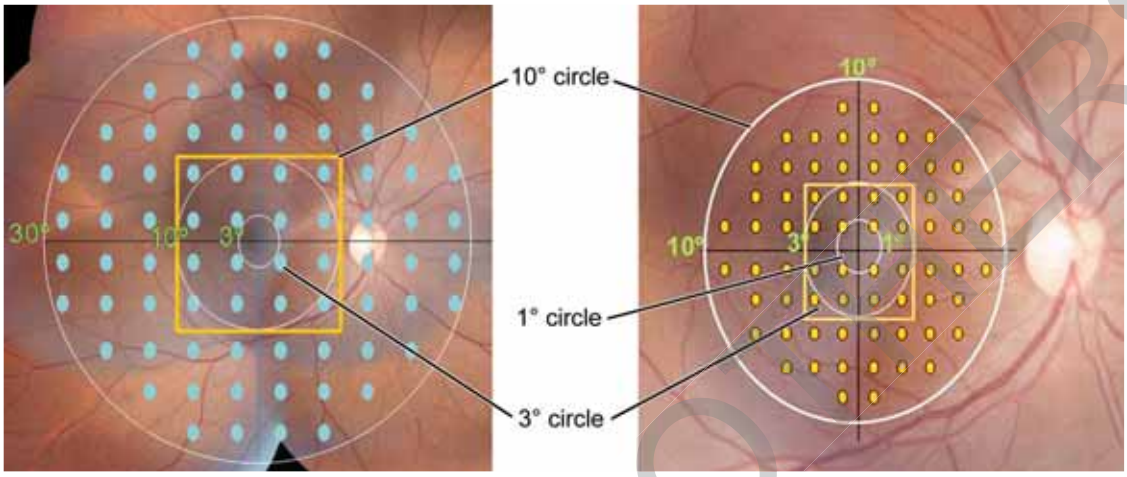
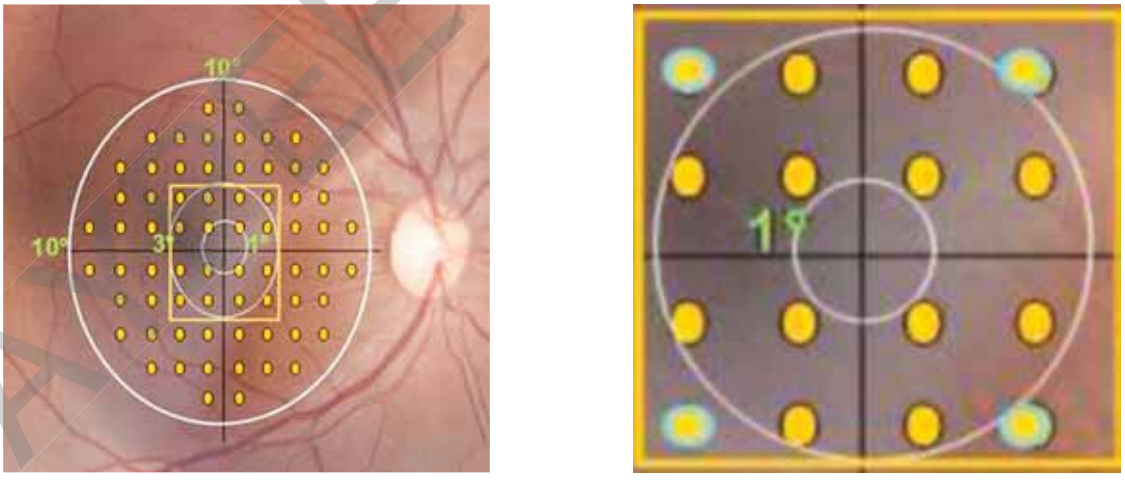
What are the indications to repeat the test with 10-2 point pattern?

The sensitivities of all the 16 points in the 10° circle area of 30-2 or 24-2 point pattern will decide whether the test should be repeated with 10-2 point pattern or not.



30-2 point pattern **10-2 point pattern**

There are 16 points in the 10° circle area of 30-2 or 24-2 point pattern. They can be divided as outer set of points (points placed at 9 degrees from the vertical and horizontal axis) and inner-set of points (points placed at 3° from the vertical and horizontal axis). The outer set of points are 12 in number and the inner set of points are 4 in number. The outer set of points are not included in the 10-2 point pattern. The 4 inner most set of points lie just outside the 3° circle are included in the 10-2 point pattern.



10-2 point pattern **Macular program**

In 10-2 point pattern, there are 16 points in the 3° circle area around the center of fixation (the bare area of 30-2 or 24-2 point pattern). Out of the 16 points, 12 points lie within the 3° circle and 4 points just outside the 3° circle. There is only 1° bare area in the 10-2 point pattern. So we almost test up to fixation in 10-2 point patterns. Now it is very clear that the foveal status should not be commented from the 30-2 and 24-2 point pattern.

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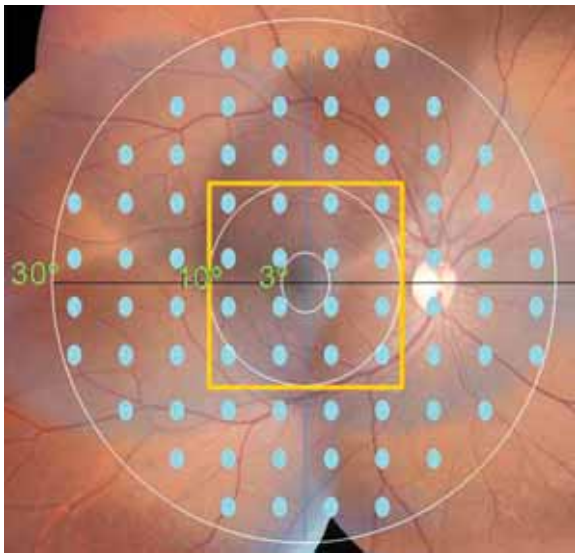
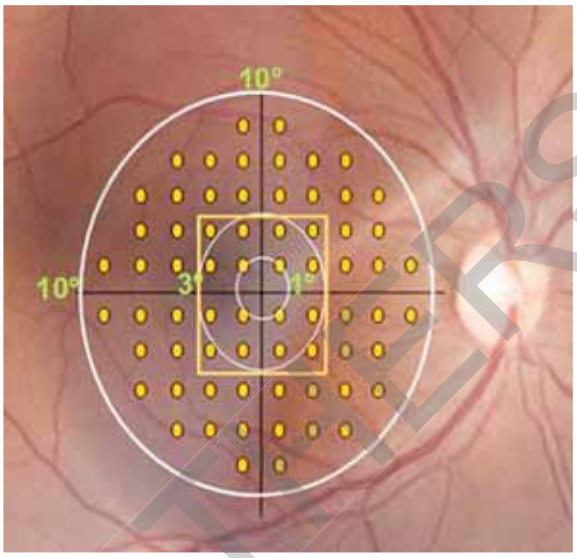
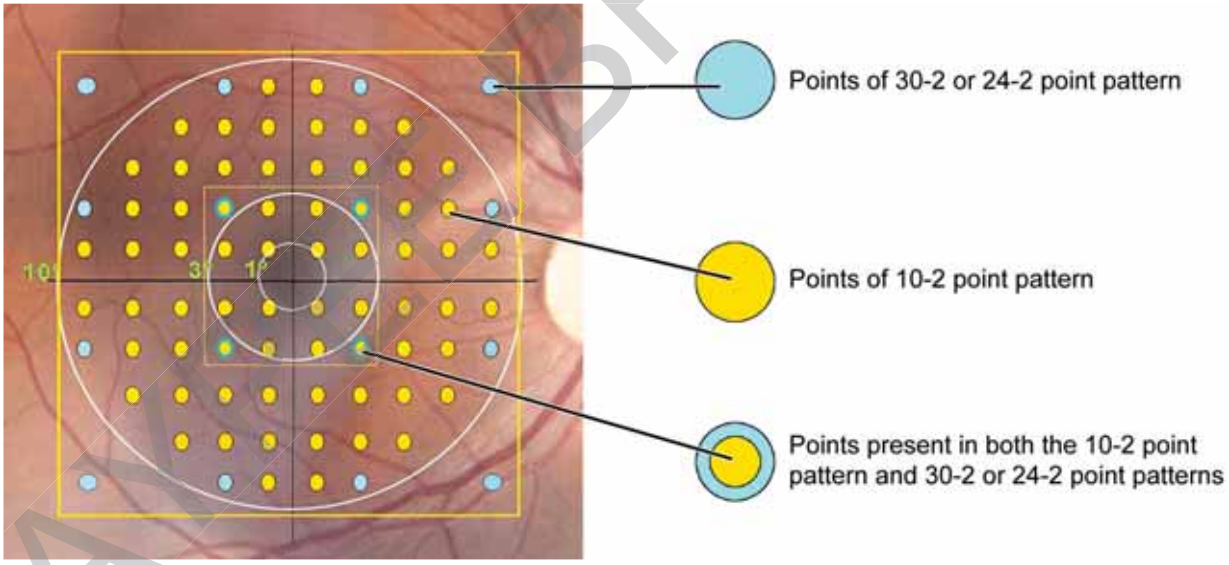


30-2 point pattern



10-2 point pattern

10° Circle Area of 30-2 and 10-2 Point Pattern



If we do the tests with both 30-2 and 10-2 point patterns, the total number of points tested in both 30-2 (24-2) and 10-2 in the 10° square area are 80.

Out of these 80 points, 12 points belong to 30-2 or 24-2 point pattern, 64 points belong to 10-2, and 4 points are present in both 30-2 or 24-2 and 10-2 point patterns.

Total number of points in 10-2 point pattern are 68 in number. But the 4 innermost set of points lie just outside the 3° circle are present in 30-2 point patterns also. The 4 innermost set of points lie just outside the 3° circle are present in 30-2 or 24-2 and 10-2 point patterns.

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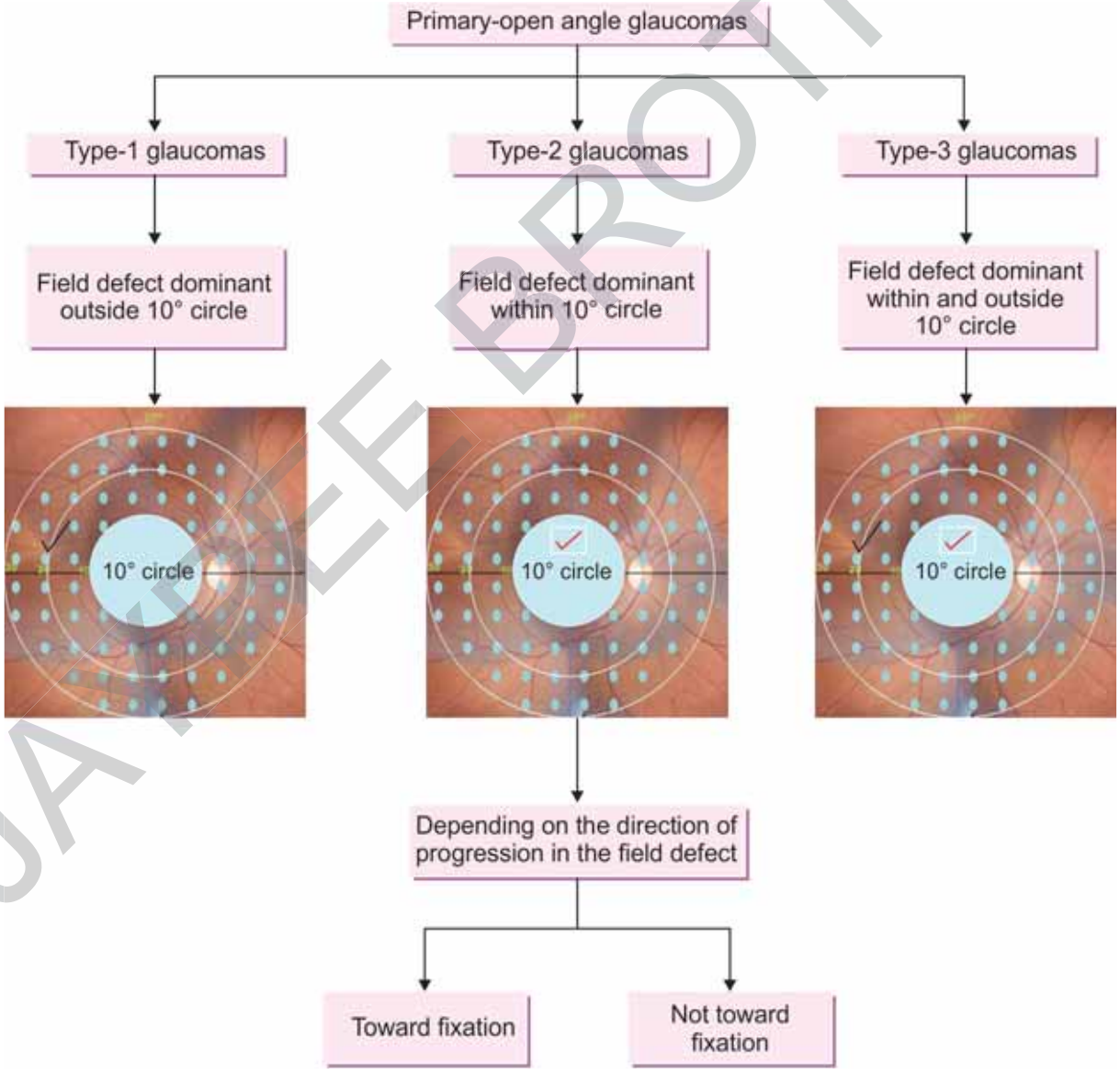
Selection of the Point Pattern

Point patterns used for glaucoma are 30-2, 24-2,10-2 and macular program. As discussed earlier it was thought that 30-2 and 24-2 are for early and established glaucomas and 10-2 and macular program tests are for advanced glaucoma. Originally primary open angle glaucomas are classified as POAG and normal tension glaucoma (NTG) on the basis of IOP. Later the concept has been changed. The most important factor in the management of glaucoma is the location of the field defect, i.e the exact location where the glaucomatous damage has begun. Now, the better way of classifying primary open-angle glaucoma is on the basis of location of the field defect. So the concept that 10-2 point pattern being reserved only for advanced glaucoma no longer holds good.

Classification of Primary Open-angle Glaucomas



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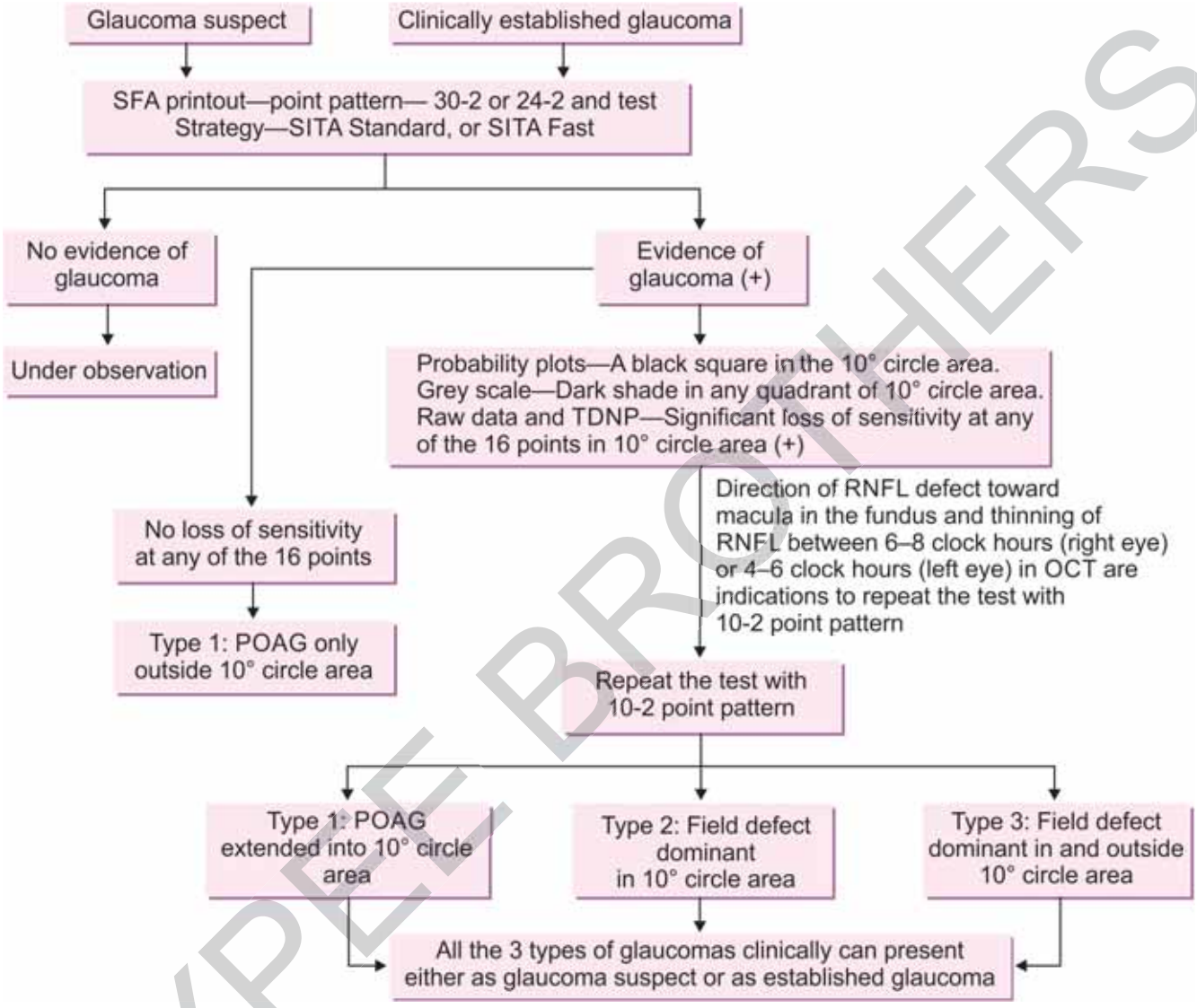
Summary of Selection of Point Pattern



It is a general concept that we should select 30-2 point pattern in a glaucoma suspect. But 24-2 point pattern is the test of choice even in suspicious cases of glaucoma because of the following reasons.

1. The outer set of points of 30-2 are not considered while selecting the 7th best deviation point of total deviation numerical plot (TDNP)
2. The outer set of points of 30-2 are not included in the five zones of GHT (Glaucoma hemifield test).
3. The outer set of points of 30-2 are not considered in the Anderson's criteria to name the field defect due to glaucoma.
4. The outer set of points of 30-2 are tested last. The patient may be fatigued by that time and chances are more to get high fixation losses and false (–) ve errors.
5. The average normative data value of the peripheral points have a wide range. Taking all the points into consideration 24-2 point pattern became the choice even for glaucoma suspects.

The details of the above said five points are dealt in the forthcoming chapters

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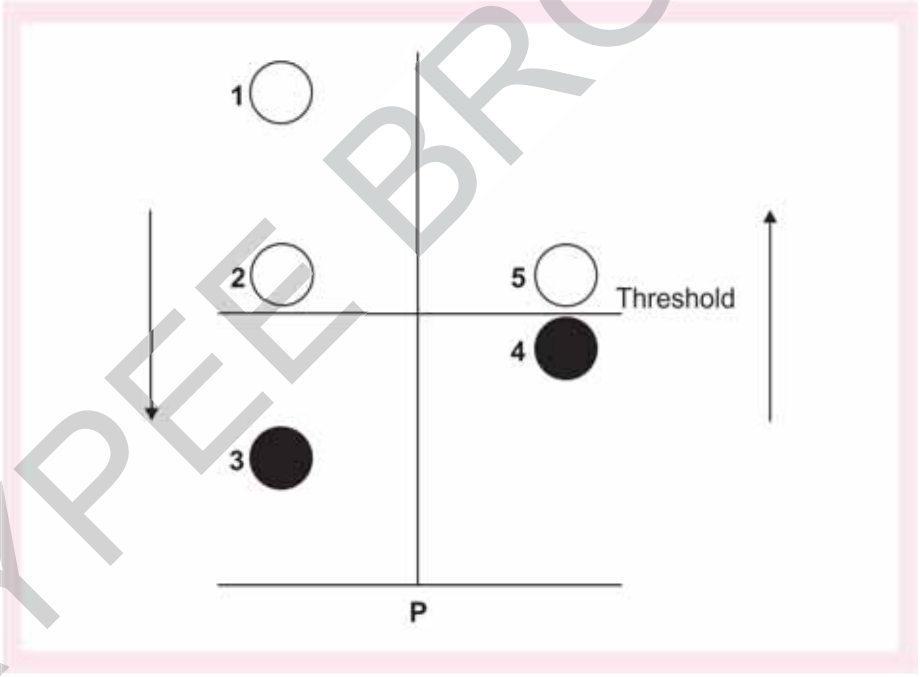
THRESHOLD TESTING STRATEGIES

The test "strategy" refers to the method of presenting stimuli to the patient to attain the desired information. There are two types of strategies: screening or suprathreshold testing strategies and threshold testing strategies. In suprathreshold testing strategies (screening test), each stimulus is intense enough to be seen by nearly all normal patients. This strategy provides only general, qualitative information about the visual field and consumes less time. While threshold strategies consume more time, they provide detailed, quantitative information to find out the threshold at each selected point of retina. There are different threshold strategies available to the Humphrey field analyzer.

The testing threshold strategies are of 2 types

1. Old standard threshold strategies –
   1. Full Threshold Strategy
   2. FASTPAC
2. Newer threshold strategies –
   1. SITA Standard
   2. SITA Fast

(SITA stands for Swedish Interactive Threshold Algorithm)



Threshold determination at a visual field point P, open circle indicates patient response to stimulus. Filled circle indicates no response to stimulus. Down arrow indicates stimuli decreasing in 4 dB steps. Up arrow indicates stimuli increasing in 2 dB steps. Numbers indicate order of stimulus presentation.

Staircase Method (Bracketing Method) of detecting threshold.

This method is used in full threshold strategy.

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DETERMINATION OF THRESHOLD

To determine threshold at each point in the test grid, stimulus intensity varies in such a way that some stimuli will be suprathreshold (brighter than necessary to elicit a response most of the time) and some will be infrathreshold (too dim to elicit a response most of the time). Threshold is thus bracketed by the stimuli as the examination proceeds. This method of bracketing is also known as staircase method for determining threshold.

Explanation of Method (Bracketing) for Determining Threshold

First stimulus: The first stimulus presented at the point P is seen and hence it is labeled as open circle 1 (See the figure in the page no. 21).

Second stimulus: Because the first stimulus is seen the intensity of light is dimmed by 4 dB. In this example, the second stimulus is also seen and labeled as open circle 2.

Third stimulus: As the second stimulus is also seen, the third stimulus is dimmed further by 4 dB. The third stimulus is too dim to elicit a response and hence indicated by closed circle 3. This is the first crossing from seeing zone to nonseeing zone.

Fourth stimulus: Now the machine makes the stimulus brighter but in 2 dB steps. The fourth stimulus is also too dim to elicit a response and hence indicated by closed circle 4.

Fifth stimulus: The fifth stimulus is further brightened by 2 dB and this time, the patient responds by pressing the button and hence labeled as open circle 5. This is the second crossing of the threshold from nonseeing zone to seeing zone. Since the step size was 2 dB, threshold is the value that lies between the intensity values of the last 2 stimuli. Obviously if the first stimulus presented to the point was not seen, the machine will make the stimuli brighter in 4 dB steps until the threshold is crossed and then dimmer in 2 dB steps until the second crossing. This standard method is adapted in determining threshold in the full threshold strategy. Thus the theoretical best threshold resolution is 2 dB.

The Newer Threshold Strategies

The newer threshold strategies reduce the test time of the threshold tests by more than 40% by measuring threshold with an alternative strategy to the standard staircase method. The newer strategies change the stimulus in 3 dB steps and cross the threshold only once. The threshold assigned to each tested point lies between the two stimulus intensities where the threshold is crossed. The theoretical best threshold resolution is 3 dB rather than the theoretical 2 dB resolution of the full threshold (algorithm) The threshold values determined by the newer fast methods were found to be similar to those found on the standard testing strategies (full threshold strategy and FASTPAC).

It is very important to note that the Full Threshold strategy is a confusing terminology because there are no half threshold strategies. Because the standard staircase method is adapted in detecting the threshold in full threshold strategy it should have been named as standard threshold strategy rather than full threshold strategy.

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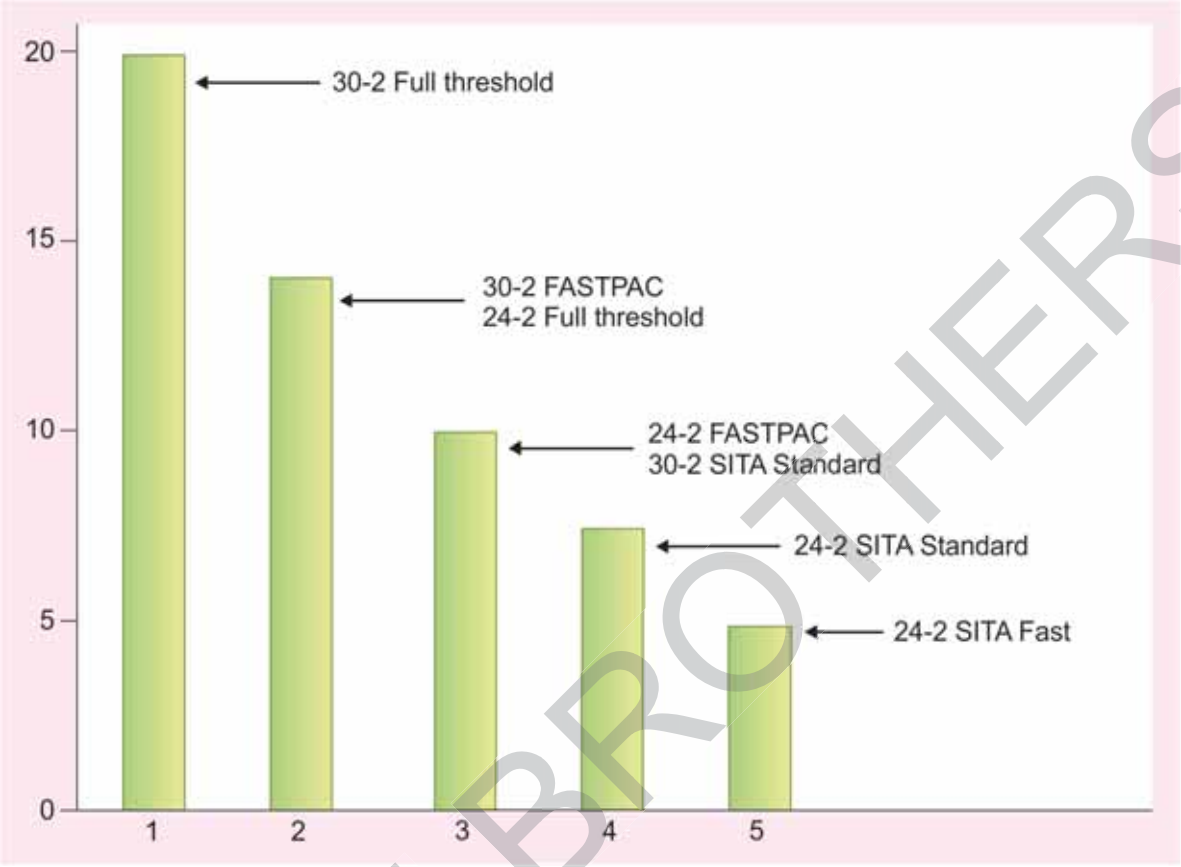

Typical test time ranges (minutes) comparative test times for four main threshold test algorithms. **Percentages are relative to typical test time for full threshold 30-2 testing.**

From the above figure, you understand the test time for each selection of the test is as follows:

1. 30-2 Full threshold—20 minutes.
2. 30-2 FASTPAC,
   24-2 Full threshold—14 minutes.
3. 24-2 FASTPAC,
   30-2 SITA Standard—10 minutes
4. 24-2 SITA Standard—7 minutes
5. 24-2 SITA Fast—5 minutes

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IMPORTANT THRESHOLD TESTS TO DETECT GLAUCOMA FIELD DEFECTS

Now, we know the available point patterns and the testing strategies. Whenever we order for a visual field test always specify the point pattern and the testing strategy.

The usual available point patterns are as follows:

- 30-2 point pattern, 24-2 point pattern, 10-2 point pattern, macular program point pattern, and custom tests.
- Available threshold testing strategies: SITA Standard, SITA Fast.

Each of the above point pattern can be tested with any of the above threshold strategy as shown below:

1. 30-2 point pattern with SITA Standard.
2. 30-2 point pattern with SITA Fast.

   Similarly, the 24-2 point pattern and 10-2 point pattern can be done with all these strategies.

   Note that

   We can tabulate the above information as follows:

	Testing Strategy	
Point pattern	***SITA Standard***	***SITA Fast***
30-2 point pattern	SITA Standard	SITA Fast
24-2 point pattern	SITA Standard	SITA Fast
10-2 point pattern	SITA Standard	SITA Fast
Macular program	Full threshold	FASTPAC
Custom test	Full threshold	FASTPAC

In general full threshold and FASTPAC strategies are not in use now and SITA Standard and SITA Fast strategies are being used in most of the cases.

If the normative data is not available to the tests, Full threshold and FASTPAC strategies are being used.

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PROFORMA OF ORDER FORM FOR VISUAL FIELD TESTING

Whenever we subject the patient for visual field testing we have to feed the field analyzer the details of the patient data and the test data accurately. For this purpose a proforma order form for visual field testing is designed. This proforma must be properly filled before subjecting the patient for visual field testing.

Patient Data	:	
Name of the patient	:	
Age/Sex	:	
VA/Refractive error correction for far and near	:	Both eyes
Pupil size	:	
Test Data	:	
Selection of the test	:	
Test point pattern	:	30-2/24-2/10-2 point pattern/Macular program.
Specify any special test	:	
Test strategy	:	SITA Standard/SITA Fast.
Fixation target	:	Central/Small diamond/Big diamond
Size of the stimulus	:	Size III/Size V
Indication for field testing	:	

Regarding fixation target, if nothing is mentioned it is understood that, it is the central fixation. In situations like macular degenerations, the fixation target has to be changed to small diamond or large diamond. Regarding the size of the stimulus, if nothing is mentioned it is understood that the stimulus size is size III. In situations like advanced glaucoma, to know macular status, size V stimulus can be used. To reduce high fixation losses sometimes we need to change the central fixation target to either small diamond or big diamond. The change of the size of the stimulus from size III to size V will also help to reduce the high fixation losses to make the test more reliable. The data in the proforma must be fed to the field analyzer accurately.

The patient should be carefully and fully educated about the performance of the test before beginning the test. Then the printout of Humphrey field analyzer will be available for interpretation.

Verify whether the test data and the patient data that are present in the visual field printouts are exactly similar or not to the data given in the proforma.

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Practical Guide to Interpret Visual Fields

Reviews

A classic on visual fields from the legend himself. An outstanding illustrated text on perimetry which will be of immense value to all trainees and practicing ophthalmologists.

—Professor Tanuj Dada
Department of Glaucoma, AIIMS, New Delhi, India

GR Reddy's *Practical Guide to Interpret Visual Fields* on automated perimetry has been a useful guide to understand the nuances and fundamentals of perimetric interpretation. Whereas several textbooks and publications have been in wide use to teach the basics of automated perimetry, this book occupies pride of place. For many of the explanations to comprehend the basic concepts of visual field interpretation, I have turned to this book, rather than textbooks published by well-known authors from the west. The deep insights of GR Reddy on visual field changes in glaucoma has been explained by ample examples and simple illustrations drawn from his own clinical practice. A most useful addition to the previous texts in the current edition has been the stress on evaluation of central 10-2 visual fields in early glaucoma as well as in assessing progression in a subset of glaucoma, where sensitivity loss is predominantly in the parafoveal region of the visual fields, which is often undetected on 24-2 threshold evaluation. It is surprising that he has been working on the central 10-2 field defects for a few years, when the significance of testing central 10-2 fields has been well established only recently in the peer-reviewed literature. I consider him the grand patriarch in the teaching of visual fields, and I wish he could spend more time traveling across the nation to ensure the younger generation of ophthalmologists receive the benefit of his extreme wisdom on visual field studies in clinical glaucoma practice. Not since the days of Professor Ravi Thomas, himself an excellent proponent of visual field interpretation, have I found a better teacher of visual fields than GR Reddy. I recommend this book to all those who are interested in understanding the finer aspects of visual field interpretation. I assure them it will profoundly influence the care of their patients by better follow-up, care and detection of progression of glaucoma and ensure optimal clinical care.

—SR Krishna Das
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