INTERPRETATION OF AUTOPERIMETRYP. Mishra¹, V. Sridevi², R. Parth³, M. Ramya⁴, G. M. Abbin⁵, V. S. Nagalakshmi⁶**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Autoperimetry is a useful clinical tool for the detection of ocular and neurological pathology. It is an essential investigation for glaucoma management including its initial diagnosis and follow up. This article deals with the basics of autoperimetry, the guidelines and algorithm for interpreting single field analysis with emphasis on follow up strategies in glaucoma. It will be of great help to ophthalmologists as well as the postgraduate students in ophthalmology.

KEYWORDS: Autoperimetry, Glaucoma, Threshold, Glaucoma Hemifield Test, Visual Field Index.

INTRODUCTION: Autoperimetry is considered as of today gold standard in glaucoma diagnosis and management and without of which the modern management of glaucoma is almost impossible. Automated visual field print out can be read by the clinician in the same manner like manual perimetric chart i.e., looking primarily for nerve fibre layer defects such as paracentral and arcuate scotomas, in addition, in this static perimetry, the threshold data can be analyzed, that may allow detection of more subtle visual field abnormalities.

The computer printout records the threshold for each retinal point tested. Threshold is theoretically the target that is just bright enough to be seen 50% of the time at that particular location.¹ Any stimuli brighter than the threshold value will be seen and those dimmer will be missed. To be more precise the computer actually detects the dimmest stimulus at predetermined locations. For all practical purposes threshold is expressed in decibels. The decibels (dB) usually refer to retinal sensitivity rather than to stimulus intensity.

The intensity of light is measured in apostilbs (asb), but is expressed in logarithmic units referred to as decibels (dB). A decibel is 0.1 log unit, so that a 10 dB decrease represents a 10 fold stimulus increase while 20 dB decibel represents a 100 fold stimulus increase. The retinal sensitivity (Threshold) usually varies from 0 – 51 i.e., 0 decibel is the brightest stimulus (10000 asb) and 51 db is the dimmest (0.08 asb) target, the perimeter can project.

The dB value of Humphrey does not match with dB value of octopus. In Humphrey the value 0 dB is equivalent to 10000 apostilbs where as it is equivalent to 1000 apostilbs in Octopus. It has to be noted that that visual sensitivity is not constant (equal) throughout visual field. Vision is most acute at the fovea (Hill of vision Fig.1) and decreases towards periphery of the retina. That is the reason why the visual field is often expressed as a "hill of vision in a sea of darkness".²

The machine records the threshold value in different retinal locations and compares the sensitivity with age matched normal individuals. If the threshold is higher i.e. 36 dB (dimmer target) the sensitivity is higher and threshold is low i.e. 20 dB (brighter target) the sensitivity is low at that retinal location. A defect or scotoma is categorized is either relative or absolute.

A relative defect is an area that has depressed vision or depressed sensitivity, absolute defect is an area where the perception of light is absent. The optic nerve head represents the blind spot, is an example of an absolute scotoma. Some defects patterns are characteristics of certain diseases,

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which makes visual field testing a valuable part of the diagnostic process and also repeating the same at later dates one can access the progression of the disease process.

Fig. 1

In kinetic perimetry, a target (stimulus) is moved into the visual field from a non-seeing area, until it is detected by the patient from various directions and one has to mark the points at which the patient first detects the target. Target of varying size and illumination are used on kinetic testing. The points joining the same sensitivity is called Isopter, in other words, for each different target a different isopter is recorded.

In static perimetry, the static refers to a stationary stimulus (unlike moving target in kinetic perimetry). In this technique predefined test locations in the visual field are tested, through a series of stimulus presentation of varying intensities, there by the threshold (dB) is determined for each point.³

Instrument: In this article we give emphasis on the Humphrey Field Analyzer II because it's the most widely used and is the one available to us. Since the introduction of computerized perimetry in the 1970's, a wide variety of models have been designed, many of these are no longer commercially available, while most of the others represent modification of the original. The Humphrey system has two new test algorithm SITA standard and SITA Fast.⁴ The instrument gives precise field measurement with unprecedented speed.

Strategy in the HFA II, there are four test strategies available for testing the threshold.

1. SITA Standard.
2. SITA Fast.
3. Full Threshold.
4. Fast Pac.

Tests Strategy:

	Humphrey	Octopus
- Central	10 – 2	32
- Central	24 – 2	G1X
- Central	30 – 2	M2X
- Peripheral	60 – 4	STX

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Please remember that, SITA cannot be used with SWAP (blue - yellow testing). All SITA tests must use a white, size III stimulus. Any time a SITA strategy is used; these two parameters will be automatically set by HFA II.

Threshold test	Extent of visual field Tested/No. of points	Application
10 - 2	10 degrees/68 point grid	Macula, retina, neurological, advanced glaucoma
*24 - 2	24 degrees/ 54 point grid, nasally 30degrees	Glaucoma, general neurological
*30 - 2	30 degrees/ 76 points, grid points 6 degrees	Glaucoma, retina, neurological/ general
60 - 4	30 to 60 degrees/ 60 points	Retina, glaucoma
Nasal step	50 degrees/14 points	Glaucoma
Macula	5 degrees/16 points 2 degree spacing	Macula

Table 1

*Commonly used programs for glaucoma

The standard program used in glaucoma patient is the 30-2. The 24-2 eliminates most peripheral test location of the 30 -2, program except for the nasal portion of the field. Many clinicians now routinely use 24-2 for glaucoma patients, because it seems to provide as much clinically useful information as 30-2 and saves test time (Fig.2). The shortest time may reduce patient fatigue and encourage cooperation and more compliance.⁵ Both the tests concentrate on central field where early evidence of glaucoma is detected. The 10-2 program is useful in patients who have very advanced field loss or for whom only a small island of vision persists near fixation. (Fig.3).

Background Illumination: It is an internationally accepted standard to choose 31.5 apostilbs as the uniform background illumination for the bowl, the one that was started with then Goldmann machine. The rationale is that it is the minimum intensity for photopic (daylight) cone-related vision. The advantage of testing the photopic system is that it is more contrast than brightness oriented. Similarly under photopic conditions, the effect of lens color, pupil size and less transparency have minimal effect on results. In scotopic conditions, absolute brightness becomes the dominant factor.

Data Analysis: The perimeter actually detects the sensitivity threshold at various location of retina (Fig 2. Section 3), the rest of the things, sections 4, 5, 6, 7, 8, are analyzed and displayed by a software program, STATPAC (Humphrey field analyzer's statistical software) which provides immediate expert system analysis of visual field test results.⁶

With this one can analyse test results at the time of examination, store test results and analyse them later, or recall previously stored tests to analyse for comparative purposes. Using results from single test, statpac can point out suspicious areas that otherwise might not be evident until subsequent tests were done.

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Using results from a series of tests it provides a highly sensitive analysis of changes in the patient's visual field over time. The Glaucoma hemifield test (GHT) compares points in the superior and inferior hemifields (Fig. 4) to provide a plain language analysis of test results.

INTERPRETATION: The Humphrey field analyzer II's software package, STATPAC, analyzes whether patients visual field is within normal limits for his age or not. It provides immediate system analysis of threshold visual field test results. It offers statistical analysis and printouts in several formats: Single field analysis, overview, change analysis and glaucoma change probability analysis.

The Statpac Single field analysis is perhaps the most useful to single threshold test. It will analyze that fall within the parameters listed below in Table 2.

Table 2: Statpac parameters for white perimetry.

Type of test – threshold.
Test pattern - control 10-2, 24-2, 30-2.
Test strategy - SITA standard, Sita fast, Full threshold, fast pac.
Stimulus colors– white.
Stimulus size - Size III.
Fixation target – Any.
Foveal threshold - on or off.
Fluctuation test - on or off (Sita test automatically set to off).
Test speed - normal or slow.

The full range of Statpac analysis may be used with all central 24-2 and 30-2 threshold test results, statpac produces a single field analysis or an overview showing upto 16 tests results. The glaucoma change probability analysis and glaucoma hemifield test (GHT) are not available with tests using the fastpac strategy.

As mentioned earlier to reduce the test time the Humphrey field analyzer (HFA-11), has 2 new threshold strategies, SITA standard and SITA fast. SITA standard strategy matches the precision of full threshold strategy while reducing test time, SITA fast further reduces the testing time.

Having received the print out from the technician, one has to interpret the field results meticulously. If one see top of the page in the print out of single field analysis (Fig.2), which presents the Section 1) General information and the patient data, Section 2) Test reliability indices, Section 3) Numerical threshold results (db), Section 4) Gray scale formats, Section 5) Total deviation, Section 6) Pattern deviation with their probability symbols, Section 7) Global indices and Section 8) Glaucoma hemifield test.

Section 1, General information and Patient Data: Shows the name of the test (central 24- 2) patient name, on which eye was performed and date of birth and age of the patient recorded for the analysis of the field. Here also note the pupil size, which should at least 3 mm and an important determinant of the overall visual field contour. In this area look for type of stimulus, strategy (SITA Fast) visual acuity of the patient and the appropriate correction of glasses while taking the test (Fig. 2).

Section 2, Test reliability indices: ⁷ In This area one can find the fixation losses. Adequate fixation is essential for achieving reliable and reproducible visual fields. Fixation losses should not

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exceed 20%. High fixation loss rates as a result of eye movements have been associated with increased variability of the visual field responses, as well as with an increased difficulty in the detection of scotoma.⁸ In case the fixation losses show XX and you are sure that the patient was fixing well, reliability indices also include False Positive and False Negative responses.

False Positive error recorded when patient responds; in fact no light stimulus is presented. False negative error is recorded when a patient fails to respond to a supra threshold stimulus (brighter target) placed in a seeing area of the visual field.⁹ In other words; patient fails to respond to a stimulus of higher intensity where a stimulus was previously reported to be seen.

A high number of false negative may be due to inattention or fatigue. Up to 15% false positive and 20% false negative errors are acceptable. An XX mark is placed beside the reliability parameters that are outside the acceptable limits. In Octopus RF (Reliability Factor) is based on false positive and false negative error. RF up to 20% is acceptable.

The reliability indices are indicators of the extent to which a patient's result can be reliable compared with the normal range of values stored in computer database. In this area you also notice the test duration which is 3.10 min (Sita Fast fig.2) and foveal threshold which is recorded as 32 db. Foveal sensitivity also is a very useful piece of information and should be turned on when threshold perimetry is performed in glaucoma patient. Normally it is around 38-40db in young persons.

Section 3, Threshold Value: print out represents the actual threshold values of each point at various location, and the section 4, represents the Gray Scale display of the actual threshold. Interpretation of the visual field entirely on basis of this is difficult; sometimes it is influenced by artifacts. However overall impression of the field can be judged in a reliable print out.

It helps as a quick guide to defective areas so that one can study in more details on Total Deviation and Pattern Deviation plot. The normal threshold is the mean threshold in normal people in a given age group at a given location in the visual field. It is against these values that machine compares the patient sensitivity. These threshold are represented in decibel (dB), in a range of 0-51. Fifty one decibel is the dimmest target and 0 is the brightest target which perimeter projects.¹⁰

It is not possible to detect 50 dB target by any normal individual probably one can detect 40 decibel that to at the fovea. One need to remember that the lower the decibel value, the lower the sensitivity, higher the decibel value higher the sensitivity. eg. 30 decibel recording has a better sensitivity than another point which detects 20 dB target.

Section 5, Total Deviation: This area represents the deviation of threshold from age matched normal individuals, is printed both numerically and with probability symbols. The numerical data, depicts the threshold values compared to a normal individual stored in the database of the computer. It is the difference between measured threshold of the individual and age corrected normal value for that location.

Cataract, miosis, refractive errors, corneal opacities, contribute to this recording that is why it represents an overall or generalized depression of visual field due to whatever cause in comparison to age related normal individuals. However it does not reveal any hidden scotoma that is present in the depressed field Figure 1 b.

This total deviation is represented by both numerical values and probability. Probability symbols high lights points those are less sensitive than normal. It is graded from 5 to 0.5 per cent,

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depicted at the bottom of the chart with corresponding gray tones. It indicates how frequently a total pattern deviation value at a particular location will be expected to be found in the normal population. Figure 5 shows numerous depressed prints in the total deviation that disappear in the pattern deviation shows that the depression is due to cataract.

Section 6, Pattern Deviation: It is the most useful analyses for diagnosis of glaucoma. This section represents true focal depression or scotomas and is diagnostic, as it primarily highlights localized visual field loss. Here the factors causing generalized depression (miosis, cataract etc.) are eliminated. The deviation is represented numerically and is complimented by a probability plot below; the symbols are similar with that of Total deviation.

The location and distribution of probability symbols in total and pattern deviation plots help define the location of the lesion responsible for the field defect and also distinguish glaucomatous from non glaucomatous visual field. Darker boxes indicate the deviation is not randomly seen in the comparable age matched controls, hence their likelihood of being more abnormal.

A cluster of 3 contiguous non edge points on the same side of horizontal with two points having a probability value less than 5% and one point less than 1% is considered as a significant defect. Here also, probability plot predicts the chances of such an abnormality occurring in the normal population. A scale is provided for interpretation. The blackest (darker boxes) indicate that less than 0.5% of the normal population would be expected to have such a depression in that area.

Fig. 2

Fig. 3

Section 7, Global Indices: Analysis of global indices are made simple with SITA. In this program there are only two parameters a) Mean Deviation (MD) and b) Pattern Standard Deviation (PSD). These are derived values, from total deviation and pattern deviation. Actually the deviations obtained are reduced to a single value and statistically analyzed. If it is significant it is complimented by probability percentages.

- a. **Mean Deviation (MD):** This is average deviation from normative data at all the tested points. Mean deviation derived from the total deviation plot, which indicates any overall depression or elevation of the person's hill of vision. It shows how much on an average the whole field departs from normal that is the average decibel deviation seen in the total deviation plot. It has got negative sign. Negative values indicated depression and mainly due to cataract, refractive error etc, but significant glaucomatous field produces a more negative value. It does not differentiate a generalized and a localized field loss. A positive number indicates a better than normal field (elevation of hills of vision). The value < -6 db indicates early or mild defect. It is called Mean Defect in Octopus.
- b. **Pattern Standard Deviation:** Shows any localized scotomas that are hidden inside the depressed field fig 1b. This localized depression is reduced to a single number derived from pattern standard deviation. This value represents localized defects (irregularity) of the hill of vision irrespective of any overall depression in the hill of vision. It is called Loss Variance (LV) in Octopus.

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SF (short term fluctuation, intra test variability) and corrected pattern standard deviation (CPSD) are no longer available in SITA programme. Therefore one need not worry about their interpretation. SF >3 is considered as an indicator of unreliable result.

Section 8, Glaucoma Hemifield Test (GHT): This is useful in the diagnosis of early glaucoma and available only in the Humphrey. Five zones in the upper field are compared to its counterpart in the inferior half (Fig. 4). This is an important diagnostic parameter for glaucoma. The test is very sensitive and specific at detecting asymmetry between two mirror imaged areas of upper and lower field. The glaucomatous defect occurs on either side of horizontal midline, never crosses it and unlikely to be symmetrical across the horizontal midline. The print out states whether glaucoma hemifield test is within normal limits, outside normal limits or border line.

Fig. 4: Superior Field zones Used in GHT

Within normal limits: The difference between the two matched zones is statistically in- significant.

Outside normal limits: If the values in any sector in the upper and lower zone differ to an extent found in less than 1% of population, GHT is considered “outside normal limits.

Borderline: The difference between the matched zone has a probability value of less than 3 per cent. General reduction of sensitivity associated with depression that are equal on both side sides of horizontal mid line, that is seen in case of advanced cataract or advanced glaucoma. Positive GHT test does not mean always glaucoma; hence a clinical correlation is required.

Abnormally high sensitivity seen in unreliable patient with high false positive.

Visual Field Index: Visual field index (VFI) ¹¹ is a single number that summarizes each patient's visual field status as a percentage of the normal age corrected sensitivity. It was originally designed to approximately reflect the rate of ganglion cell loss. It is derived from the pattern deviation plot and is center weighted, considering the high density of the retinal ganglion cells in the central retina. This implies that while calculating, the central points are given more weightage than the peripheral. This index is less affected than the MD by factors that cause a general reduction in sensitivity like cataracts, miosis, and refractive error.

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It is given as a percentage and the minimum value is 0 for a blind field and 100% for a normal individual. It is also plotted against time to obtain a trend analysis and slope on similar lines as a MD value, after five reliable fields covering at least 2 years. Glaucoma progression analysis (GPA) provides a projection of the linear regression line into the future, if the width of the calculated 95% confidence interval for VFI slope is found to be acceptably small- no longer VFI value of $\pm 2.5\%$. Otherwise it gives a message that confidence interval is too large for the calculation and does not calculate the slope.

The projected goal predicts the future trend provided the existing rates continue and there is no alteration of therapy. This indeed translates into what "COULD" happen if existing trends were to continue. Projections never exceed 5 years and are never longer than the measured follow up period and are demarcated by two vertical lines each at the start and the end of this projection. The vertical bar on the right of this graph indicates the change in percentage VFI over time considering the same slope.

At the bottom of the VFI plot the slope with the confidence limit and the rate of progression with its statistical significance is given. This is the most useful piece of information in the trend analysis that can translate into alteration of therapy, when used in conjunction with the life expectancy and physical state of patient.

In the USA a reasonable goal therapy is to maintain at least 50% VFI in the better seeing eye. MD of -22 dB corresponds to approximately a VFI of 30%.

Parts of printout: The statistical package that is available with the Humphrey device is called STATPAC. The analysis of the data acquired is presented in 5 formats: ¹¹

1. Single field analysis.
2. Change analysis.
3. Overview printout.
4. Glaucoma change probability (GCP, with the Full threshold test).
5. GPA (with the SITA test).

How to read a Printout:

GRADES (mnemonic for the interpretation of the flow chart).

G = General information.

R = Reliability.

A = Abnormal or normal field.

D = Defects, after analysis of the field defect should be named/ classified.

E = Evaluate, Once the defect has identified, one should try and correlate clinically and evaluate about the patient's disease status.

S = Subsequent evaluation. This is applicable in case repeat fields are done after some time to evaluate the progression (stable, deterioration or improvement) of the field defect.

Table 3: Clinical approach for Single Field Analyses:

1. Ensure patient data is correct and test strategy used is what you recommended.
2. Establish that field is reliable.
3. Assess total deviation plot and pattern deviation plot.

4. Look at global indices, GHT message.
5. Overview the gray scale.
6. Apply criteria for abnormality.

Table 4: Minimal criteria on a visual field (Anderson's criteria):

1. A cluster 3 or more non edge* points in a location typical for glaucoma all of which are depressed on Pattern Deviation plot at $P < 5$ percent level and one of which is $P < 1$ percent level on two consecutive fields.

*(Edge points valid in case of 24-2 program)

2. A PSD in SITA or (CPSD) that occurs in less than 5 per cent of normal fields or 2 consecutive field.
3. GHT outside normal limits on 2 consecutive fields.

All this defects should be reproducible and should be demonstrated on two consecutive tests.

How does a typical cataract look in a automated perimetry? (Fig.5):

1. The grey scale is depressed all over.
2. Total deviation plot shows several points that are depressed to an extend that would be found minority of normal population.
3. Pattern deviation plot reveals no abnormality.

What about a typical glaucomatous defect? Fig. 6:

1. The grey scale shows something wrong on the upper nasal quadrant.
2. Total deviation plot shows several point depressed in the upper nasal quadrant.
3. These points persist in the pattern deviation plot.

All the criteria for a glaucomatous field defect are fulfilled.

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Fig. 5

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Fig. 6

Criteria for progression of visual field: Is the defect progressing? Before we comment, we must ensure that we have a base line visual fields to compare. It is important to rule out artifacts or role of cataract, refractive errors even miosis.

The guidelines to assess the progression are:

1. New defect is noted in a previously normal area.
 - a. Cluster of 3 points worsened by 5 db each, 1 of which has worsened by 10 db.
2. Previously abnormal region has deepened if: 3 or more points have worsened by 10 db.
3. Previous abnormal region has widened if: 2 or more new contiguous points are involved.

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The detection of progression in visual field loss is a complex issue because of various factors involved in the long term fluctuation of test results. The newer software however has been designed to display serial visual field data to assist detection of progress. Three programmes namely 1) overview printout, 2) Change analysis print out and 3) Glaucoma change probability printout are available with current softwares. Generally for purpose of follow up we prefer to use the overview and glaucoma change probability.

Change analysis: This report can include maximum of 16 tests and is presented in a form of box plot analysis of test, a summary of the global indices and linear regression analysis of MD, all on one page. (Fig 7).

Box plot: The plot is a modified histogram that gives a summary of TOTAL DEVIATION test values for each test with reference to the age related STATPAC database, but without reference to the location on the field. It is basically a distribution of all the point thresholds around their mean and how much they deviate from it. It is in the shape of a box located on a line the arms of the line and the length of the box varying according to the extent of distribution of the points around their mean values. The “box plot” is charted from the “total deviation plot”.

The central dark line in the box is the mean of all deviation and should represent the 50 percentile point. The upper end of box represents 85 percentile point (i.e., only 15% points show more than this deviation on positive side.) and the lower end of box represents the 15 percentile point (i.e., only 15% points show more than this deviation on negative side.). The upper end of upper tail represents 100 percentile point of total deviation plot and the lower end of lower tail represents the 0 percentile point of total deviation.¹¹

In generalized depression the total box plot shifts down without any change in shape from the normal.

In small localized defect the position of the box plot remains the same as that of normal, but the lower limit gets elongated below.

In large defects (approximately involving more than 15% of the points tested) the box and the dark line of the mean shifts down with the elongation of its tail.

The change analysis gives a general idea about the change in the field in subsequent testing; however, it does not give an idea about progress at each location.

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1. Statistically while evaluating the change probability maps one should expect that 5% of the points will be falsely flagged on the basis of chance alone, due to random test variability. Hence it is important to remember that reproducible change is a must to document true worsening.
2. Credible change must be seen at multiple test locations.

GPA - Summary Excel

Name: _____ DOB: _____

ID: _____

Baseline: Full Threshold

Graytone Pattern Deviation

29-11-2004 GHT: Outside normal limits

FL: 5/28 FN: 1/18 FP: 0/19
Fovea: OFF MD: -6.79 dB P < 0.5%
VFI: 93% PSD: 7.22 dB P < 1%

Central 30-2 Threshold Test

Graytone Pattern Deviation

10-02-2006 GHT: Outside normal limits

FL: 0/0 FN: 0/15 FP: 0/17
Fovea: OFF MD: -7.26 dB P < 0.5%
VFI: 90% PSD: 7.11 dB P < 1%

4.1 mm

VFI Progression Graph

Rate of Progression: $-3.1 \pm 1.2\%$ /year (95% confidence)

Slope significant at P < 1%

Follow-up: _____ See Full GPA printout for complete analysis

Graytone Pattern Deviation Deviation From Baseline Progression Analysis

17-11-2012 SITA-Standard GHT: Outside normal limits

FL: 1/21 FN: 13% FP: 2%
Fovea: OFF MD: -14.34 dB P < 0.5%
VFI: 71% PSD: 12.27 dB P < 0.5%

5.0 mm

Likely Progression

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The printout of the GPA is available in four formats ranging from the multipage review of the patients entire field history to the abbreviated summary that appears as a small part of HFAs single field analysis report. The GPA summary report among them is the recommended printout for Glaucoma management. The full GPA detailed report is used usually only if a major therapeutic intervention is contemplated.

The trend analysis, however, can include as many as 15 tests on a single printout and can be used for the calculation of the rates of progression. It can be seen on two places in the printouts; the change analysis (regression analysis of the MD) page and the VFI trend. The two, however, have different significance, but in common, both can be plotted only after five valid tests.

The MD slope is calculated from the MD plot and is not centre weighted, hence affected by pupil size, media opacities like cataract, etc., whereas the VFI is calculated using the pattern deviation, which is centre weighted and less affected by the above. It is noteworthy, however, that if all the variables affecting the MD are removed the MD plot will closely follow the VFI plot.

Another fundamental difference to be understood is that, due to the different nature of the calculation, the value of MD in a blind field will depend on the strategy used, whereas the VFI of the blind field will always be 0. These plots give us the slope and their statistical significance, in other words the rate of progression and have to be put in perspective to correlate with the life expectancy in taking therapeutic decisions.

Overview print out displays gray scale, measured threshold, total deviation and pattern deviation on a single sheet of paper upto 16 fields, can be pointed on a single piece of paper. Looking at the overview program, one can assess the field whether total deviation is getting worst, whether the pattern deviation plot also becoming worsened or not) if it is getting worse in the pattern deviation, the patient probably has glaucoma worsened.¹² If you see the total deviation plot is only getting worsened, the patient probably had cataract.

To conclude the automated perimetry has several advantages which is the current state of art in visual field testing. It is universally standardized and acceptable, newer strategy SITA Fast is equally sensitive and saves much time, is very useful in diagnosis and management of glaucoma. Now, the autoperimetry has developed to a stage where it can be used routinely in majority of patients to detect early visual field changes and to follow up patients with established field loss.

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