E S G

EGYPTIAN SOCIETY FOR THE GLAUCOMAS

Moustafa Nassar

Visual Field Testing

13-13

BY

MOUSTAFA NASSAR

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and Secretary General of ESG

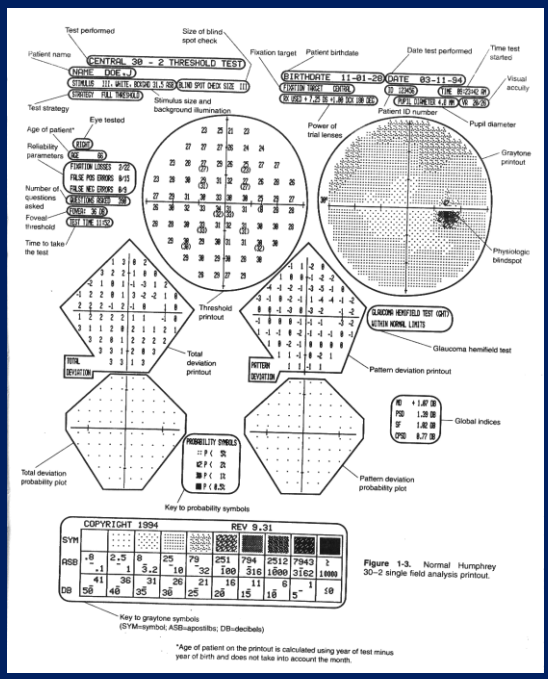
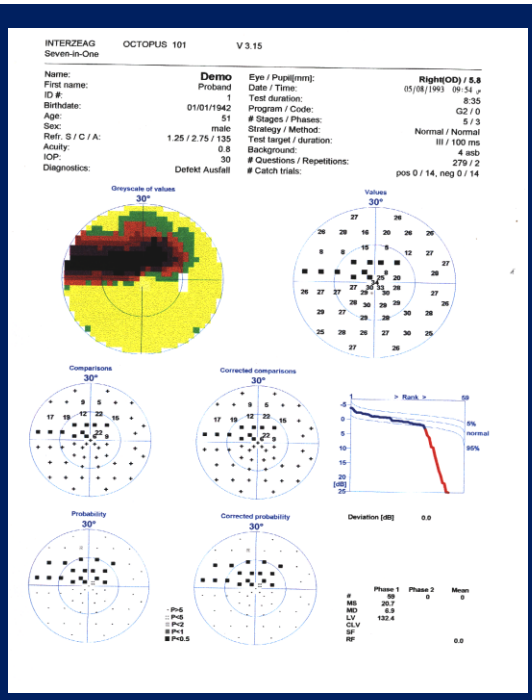
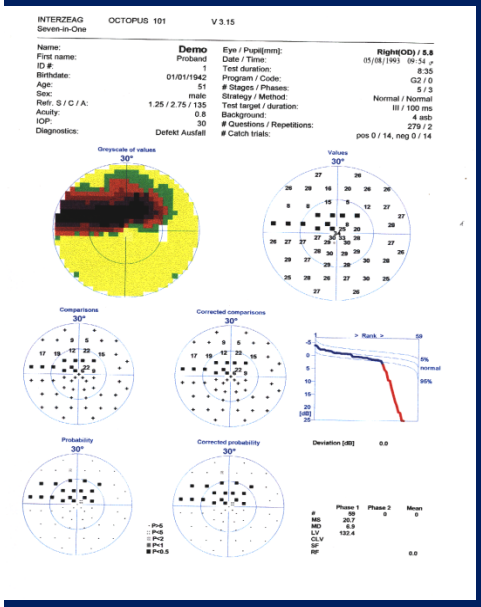
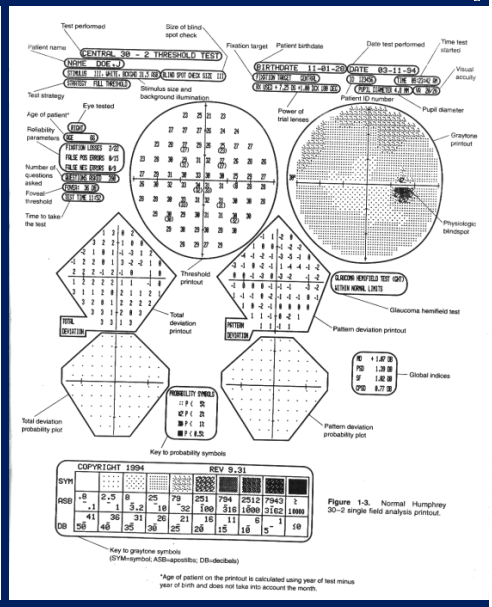


Figure 1-3. Normal Humphrey 30–2 single field analysis printout.







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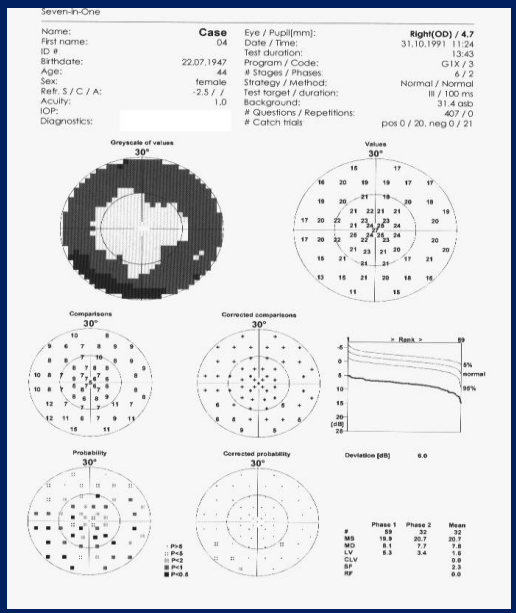

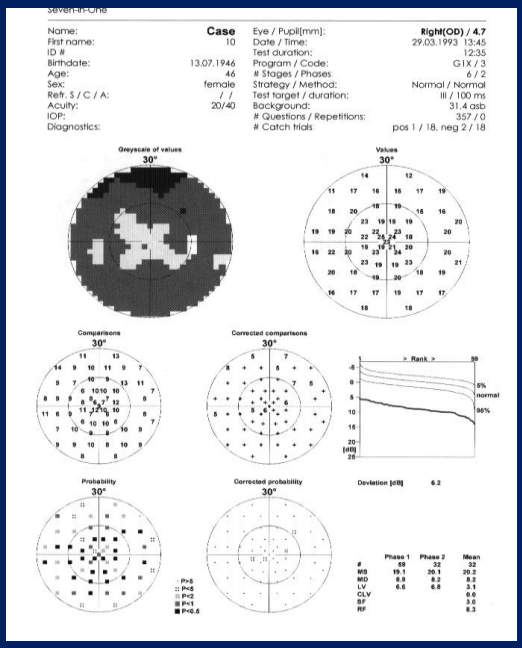

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Glaucoma and visual field

- Glaucoma is ***an optic n. neuropathy with early functional and late morphological changes***.
- Visual field is ***the extent of an area ,one fixating eye can see.***
- The retinal sensitivity is measured in dB which is a % calculated by the ability of a certain point to distinguish between unequal illumination densities, i.e. the ability of these locations to discriminate different light intensities (deferential light sensitivity) or retinal threshold.
- The ratio of two powers in a mechanical system is expressed in logarithmic units called ***decibels (dB)***.

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Visual field defects, are areas within the field of vision, where specific targets are not detected by the patient.

Glaucomatous field defects are determined by the anatomy of the retinal nerve fiber layer and the optic nerve head (respect horizontal line).

Neurological VF defects respect vertical line.

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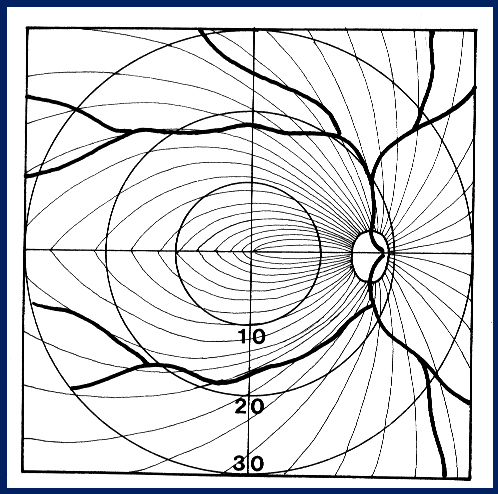

Superiotemporal and inferiotemporal retinal nerve fibers, follow an arcuate pathway around the fovea, to meet at median raphe. Damage to this portion of the nerve fiber layer is responsible for arcuate field defects seen in glaucoma.

*Modified from Shields MB: Textbook of Glaucoma, 3rd ed.. Baltimore: Williams & Wilkins;*1992.

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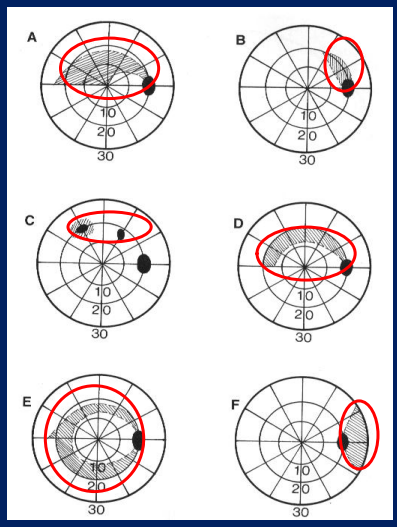
Arcuate visual field defects:



A. Bjerrum's region extends from the blind spot to the median raphe in an arcuate path which encompasses 10-20; nasally from fixation

B. Seidal scotoma

C. Paracentral scotomas

D. Arcuate or Bjerrum scotoma

E. Double arcuate scotoma

F. Temporal wedge defects produced by damage to the nasal neuroretinal rim and are not arcuate in nature.

Modified from Shields MB: Textbook of Glaucoma, 3rd ed.. Baltimore: Williams & Wilkins,1992.

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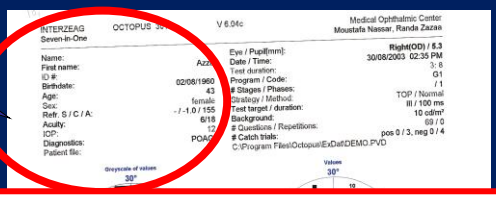
Patient Data



Name:	Azza
First name:	
ID #:	
Birthdate:	02/08/1960
Age:	43
Sex:	female
Refr. S / C / A:	- / -1.0 / 155
Acuity:	6/18
IOP:	12
Diagnostics:	POAG
Patient file:	

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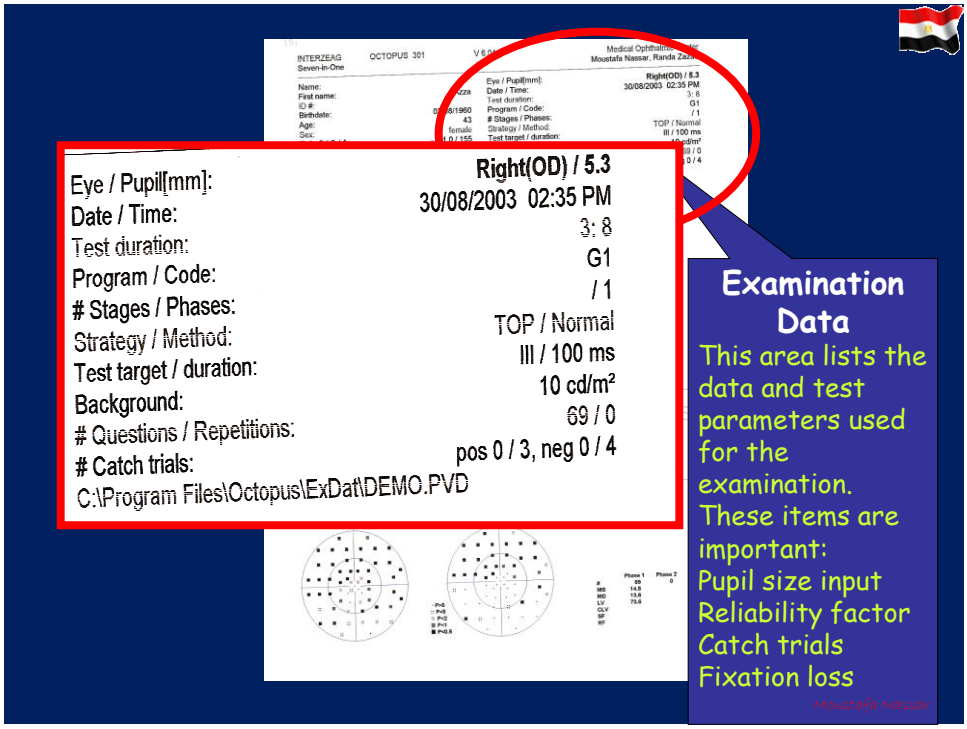

Name:	Demo	Eye / Pupil[mm]:	Right(OD) / 5.8
First name:	Proband	Date / Time:	05/08/1993 09:54
ID #:	1	Test duration:	8:35
Birthdate:	01/01/1942	Program / Code:	G2 / 0
Age:	51	# Stages / Phases:	5 / 3
Sex:	male	Strategy / Method:	Normal / Normal
Refr. S / C / A:	1.25 / 2.75 / 135	Test target / duration:	III / 100 ms
Acuity:	0.8	Background:	4 asb
IOP:	30	# Questions / Repetitions:	279 / 2
Diagnostics:	Defekt Ausfall	# Catch trials:	pos 0 / 14, neg 0 / 14

Catch trial:

- False + ve →happy trigger: patient gives a +ve answer each time he hears the sound of the projector, whether there is a stimulus presented or not.
- False -ve →inattentive patient: on retesting a previously observed location with a much brighter stimulus, the patient fails to respond .
- Fixation Loss: It is video monitored. On projecting a stimulus into the patient's blind spot; if patient does not respond, then proper fixation is assumed. If on the other hand, the patient responds, then a fixation loss is recorded.

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Name:	**Demo**	Eye / Pupil[mm]:	**Right(OD) / 5.8**
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Acuity:	0.8	Background:	4 asb
IOP:	30	# Questions / Repetitions:	279 / 2
Diagnostics:	Defekt Ausfall	# Catch trials:	pos 0 / 14, neg 0 / 14

Short- term Fluctuation;

- Determined by re-thresholding 10 locations. If this number in dB is very high than the first threshold, this may indicate patient unreliable.
- On the other hand, high short-term fluctuation in a field whose reliability parameters are good, indicates early sign of glaucoma damage.

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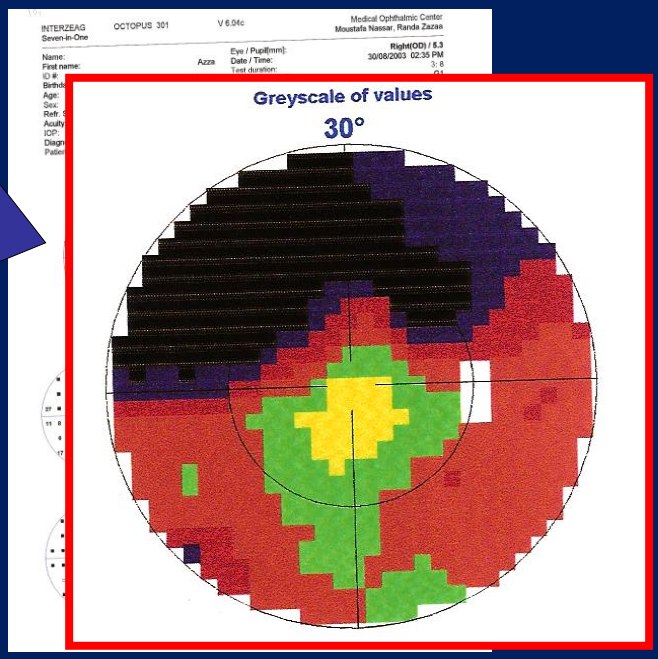
Gray Scale
Shows depth and location of visual field defects in shades from white to black, or from bright color to dark tones.



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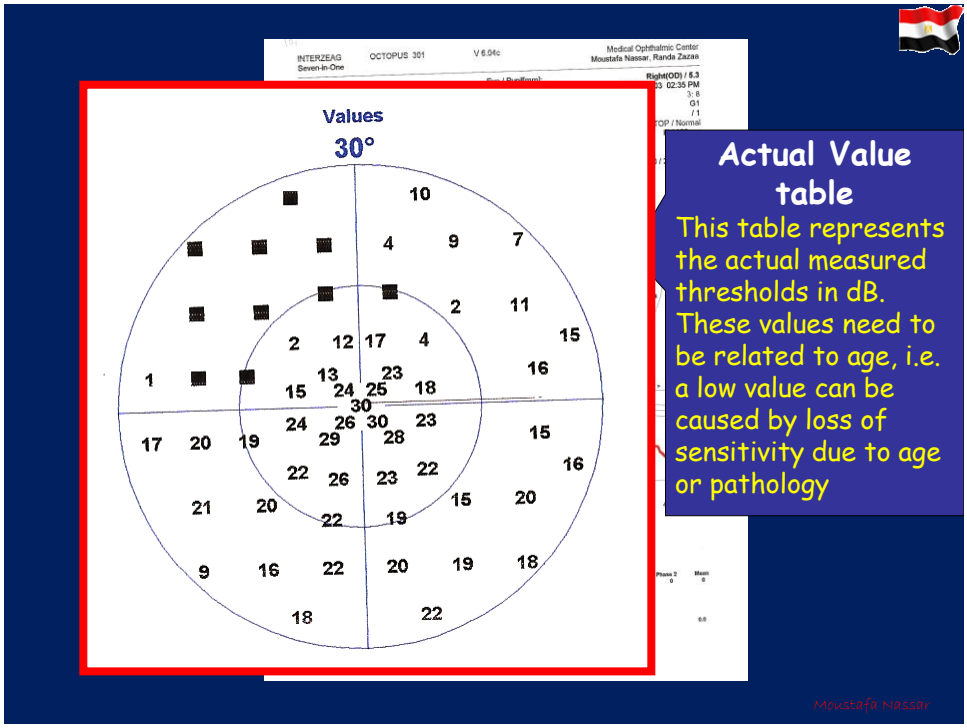
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V 6.04c
Medical Ophthalmic Center
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Values
30°
Actual Value table
This table represents the actual measured thresholds in dB. These values need to be related to age, i.e. a low value can be caused by loss of sensitivity due to age or pathology
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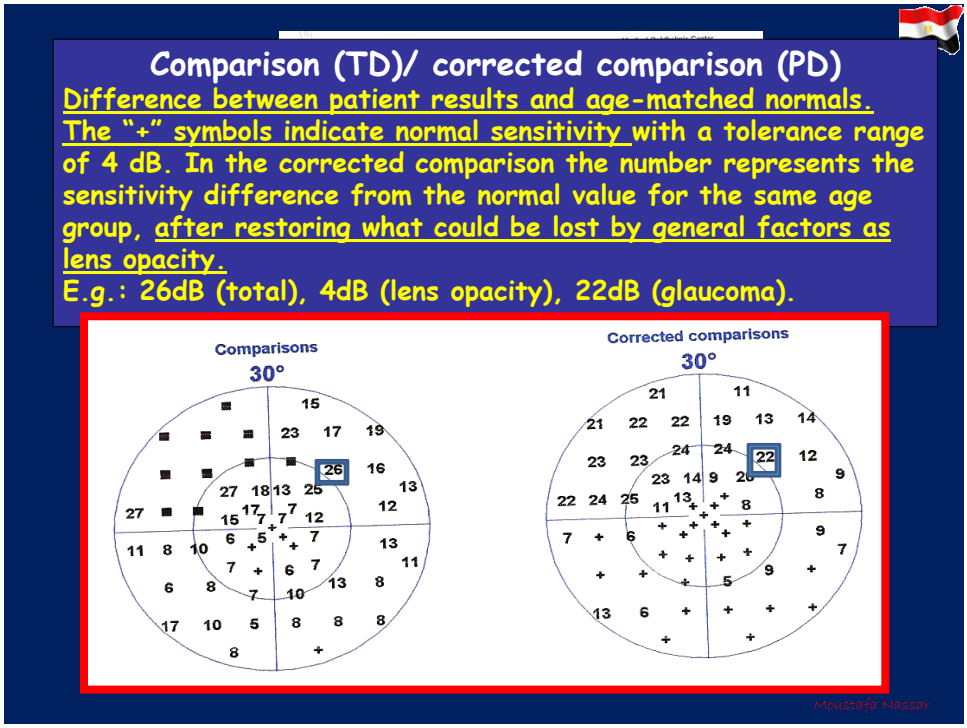
Comparison (TD)/ corrected comparison (PD)
Difference between patient results and age-matched normals. The "+" symbols indicate normal sensitivity with a tolerance range of 4 dB. In the corrected comparison the number represents the sensitivity difference from the normal value for the same age group, after restoring what could be lost by general factors as lens opacity.
E.g.: 26dB (total), 4dB (lens opacity), 22dB (glaucoma).
Comparisons
30°
Corrected comparisons
30°
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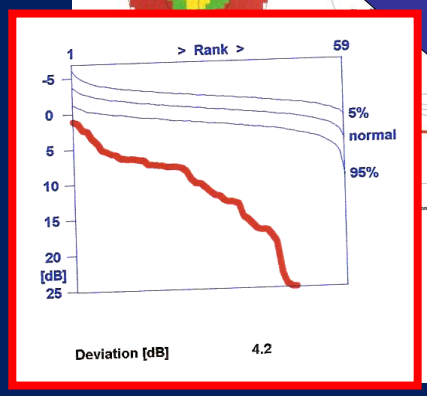
Bebei Curve

Ranking all defects values from left to right. The Bebei curve shows actual visual field results together with the normal bandwidth. It clearly differentiates uniform depression(parallel to the band of normality) from localized defects (steep decline). Without the Bebei curve uniform loss, which can be caused by early glaucoma, is easily missed.



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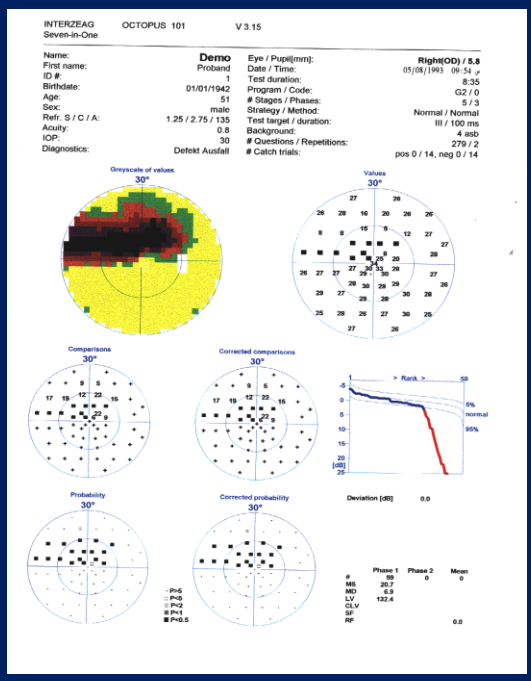

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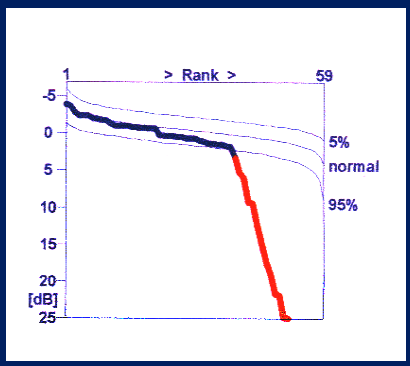
4. Defect (Bebie) Curves:



- The Bebie Curve is a unique Octopus feature.
- It is an additional graph to clearly and quickly asses the characteristics and depth of the defects in dB, sorted in rank from the most sensitive value to the deepest defect, from left to right.

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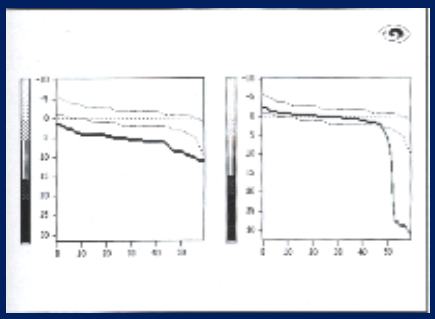
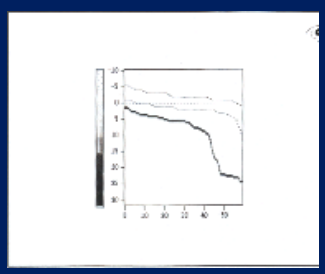


- On the left: Bebie curve of the visual field shows diffuse damage.
- The right curve shows local visual field damage.



- The Bebie curve in this visual field shows combined diffuse and local damage.

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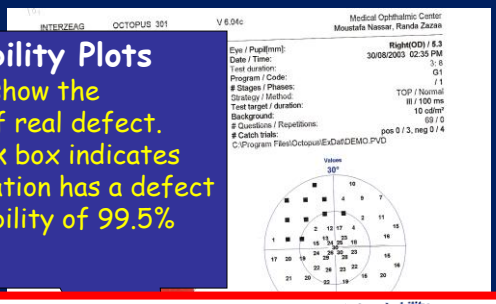
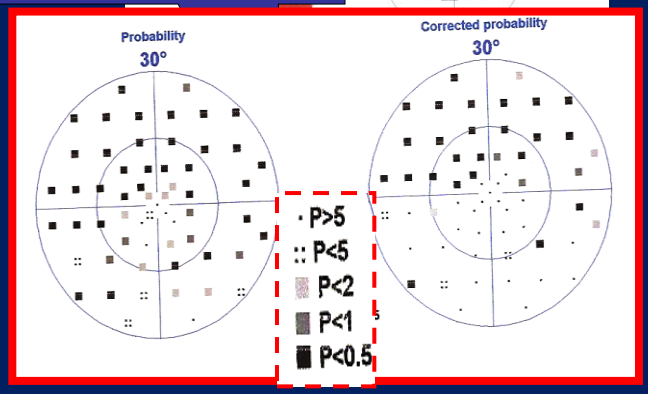
Probability Plots

These plots show the probability of real defect. The full black box indicates that this location has a defect with a probability of 99.5% (100-0.5%).





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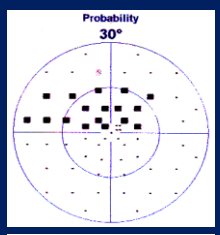
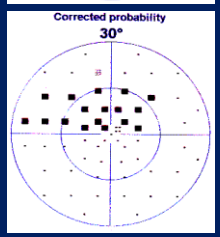
3. Probability Maps:





- Compare measured threshold at each location to the distribution of thresholds of an age-corrected normal population.
- The points that show a decrease in sensitivity, whether in comparison or corrected comparison, are compared to related points stored in the computer for the same age group to know whether the decrease at that point takes place frequently , therefore they are insignificant.
- If it takes place rarely, then it is significant. It can be probably considered as a scotoma.
- The more the degree of probability, the darker the shadow of the point is.

P < 5% → not significant

P < 0.5% → highly significant

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Global indices

Statistical information about uniform (MD) and localized loss (LV) in the hill of vision. They provide a quick and easy assessment of the field. For example the visual field is abnormal when the MD =2.5dB (normal tolerance range between -2 to +2 dB). Loss by 1dB in MD=10% loss of visual function.

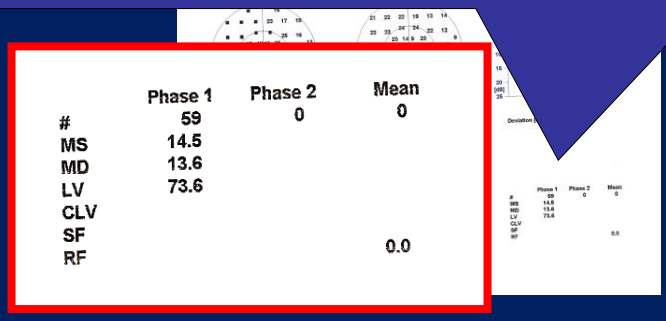
LV (PSD) N=0.6.

Follow-up of MD and LV is an indicator of the extent and depth of pathology.

CLV N=0.4

SF N=>1.5dB indicative of early pathology.

The reliability factor (RF) is a percentage value of the +ve and -ve catch trials. For reliable results, the RF should be >15%.



	Phase 1	Phase 2	Mean
#	59	0	0
MS	14.5		
MD	13.6		
LV	73.6		
CLV			
SF			
RF			0.0

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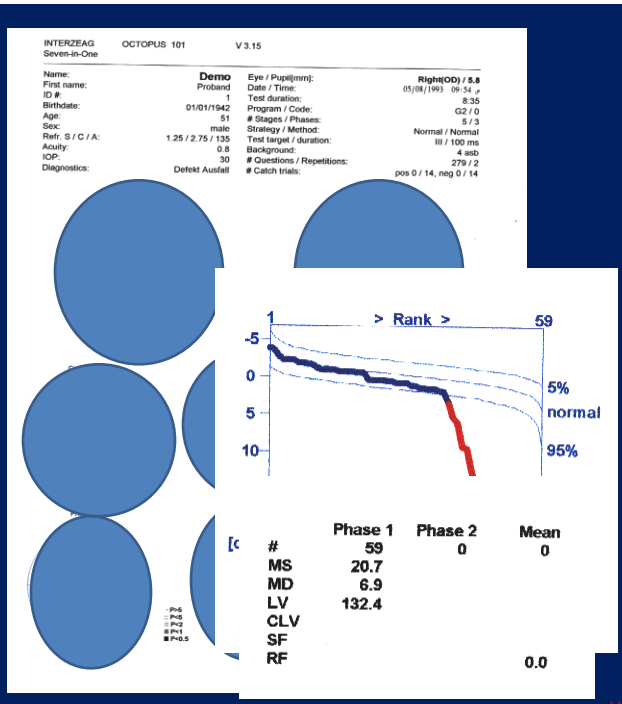

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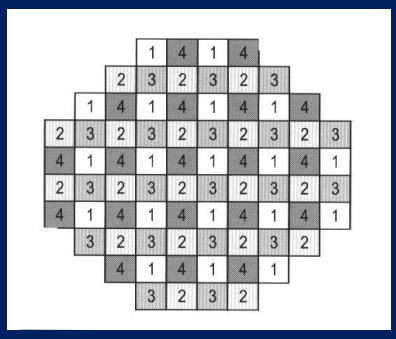
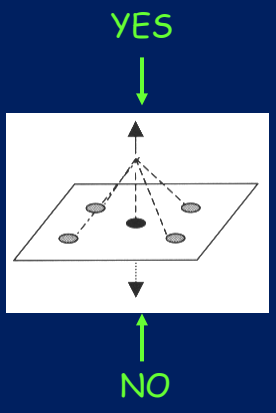
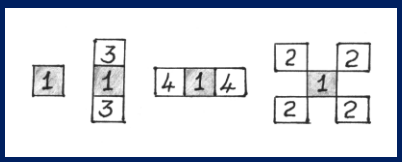
D.Fast strategy: Top strategy







a- The 4 submatrices

b- each is examined once but four successive influences are used to calculate the threshold in point 1

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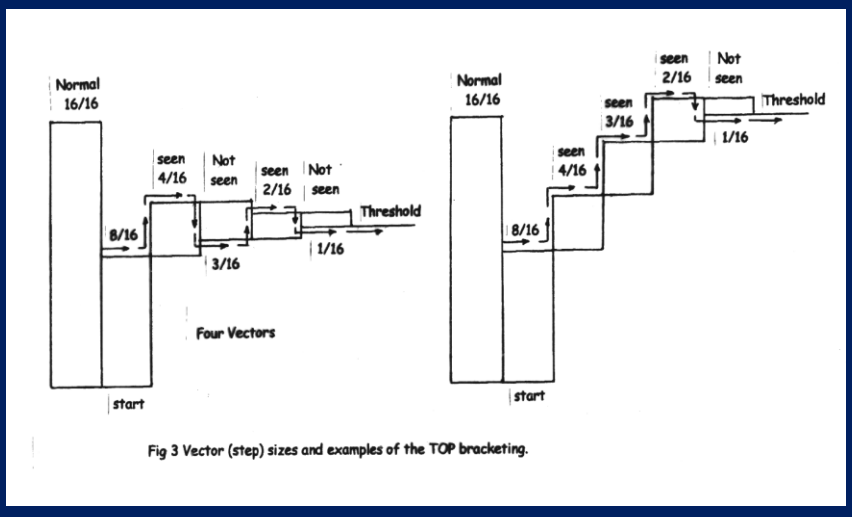

Fig 3 Vector (step) sizes and examples of the TOP bracketing.

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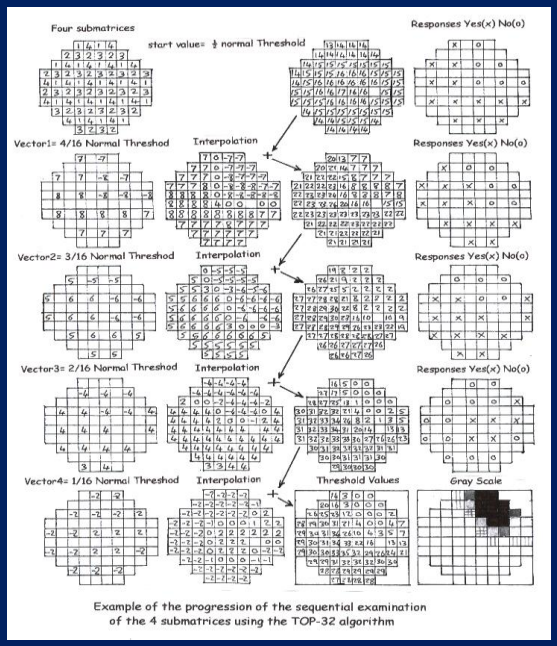

Example of the progression of the sequential examination of the 4 submatrices using the TOP-32 algorithm

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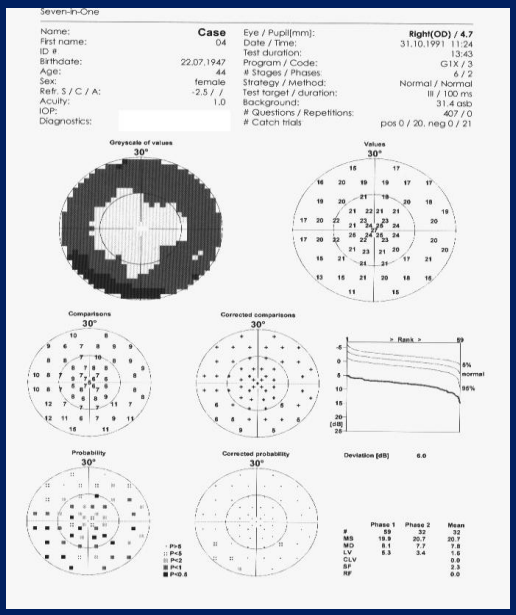

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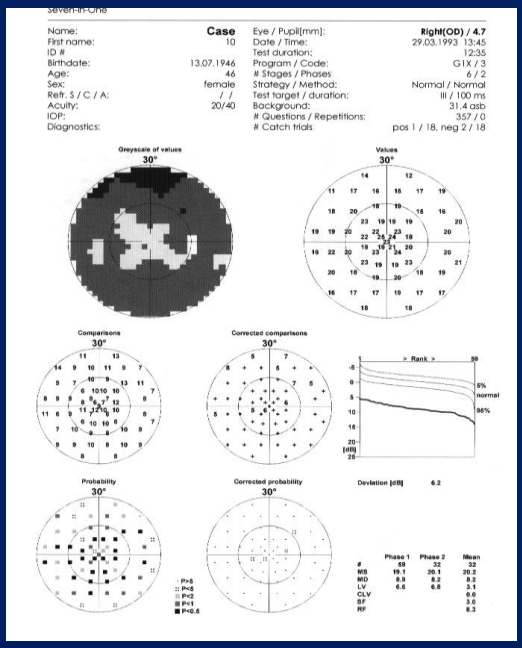

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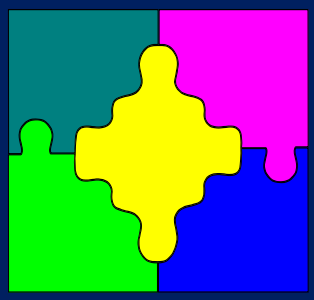

Puzzle Solved !!!

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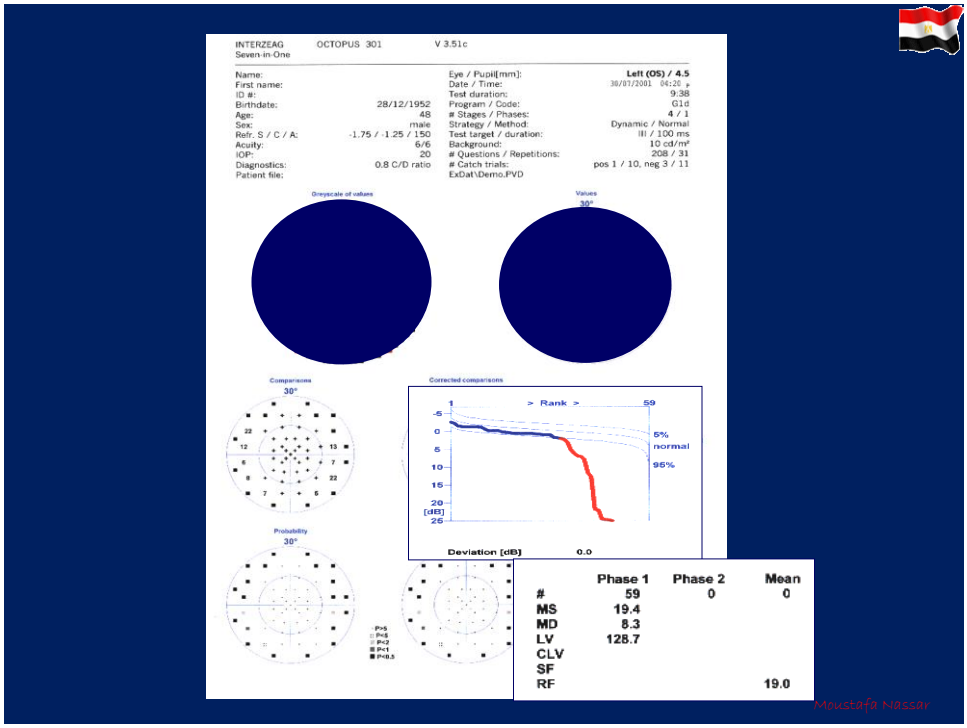
INTERZEAG
Seven-in-One
OCTOPUS 301
V 3.51c
Name:
First name:
ID #:
Birthdate: 28/12/1952
Age: 48
Sex: male
Refr. S / C / A: -1.75 / -1.25 / 150
Acuity: 6/6
IOP: 20
Diagnostics: 0.8 C/D ratio
Patient file:
Eye / Pupil[mm]: Left (OS) / 4.5
Date / Time: 30/07/2001 04:20
Test duration: 9.38
Program / Code: G1d
Stages / Phases: 4 / 1
Strategy / Method: Dynamic / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 208 / 31
Catch trials: pos 1 / 10, neg 3 / 11
ExDat\Demo.PVD
Greyscale of values
Values
Comparisons
Corrected comparisons
> Rank >
5%
normal
95%
Probability
Deviation [dB] 0.0
Phase 1 Phase 2 Mean
59 0 0
MS 19.4
MD 8.3
LV 128.7
CLV
SF
RF 19.0
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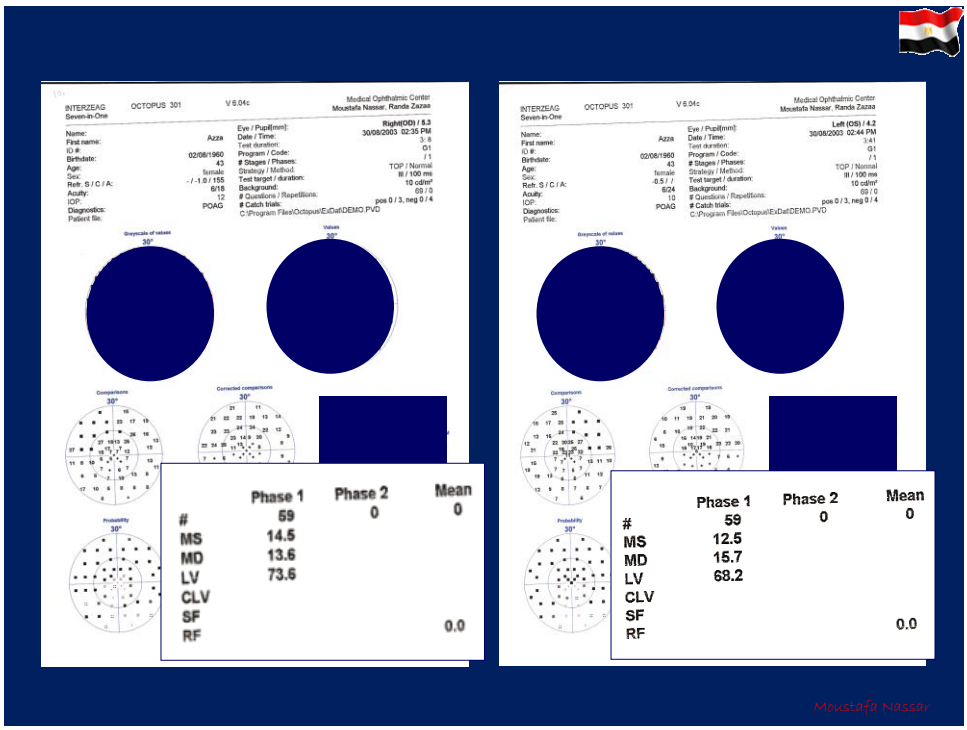
INTERZEAG
Seven-in-One
OCTOPUS 301
V 6.04c
Medical Ophthalmic Center
Moustafa Nassar, Randa Zazaa
Name:
First name:
ID #:
Birthdate:
Age:
Sex:
Refr. S / C / A:
Acuity:
IOP:
Diagnostics:
Patient file:
Azza
02/08/1960
43
female
- / -1.0 / 155
6/18
12
POAG
Eye / Pupil[mm]:
Date / Time:
Test duration:
Program / Code:
Stages / Phases:
Strategy / Method:
Test target / duration:
Background:
Questions / Repetitions:
Catch trials:
C:\Program Files\Octopus\ExDat\DEMO.PVD
Right(OD) / 5.3
30/08/2003 02:35 PM
3:8
G1
/ 1
TOP / Normal
III / 100 ms
10 cd/m²
69 / 0
pos 0 / 3, neg 0 / 4
Greyscale of values
Values
Comparisons
Corrected comparisons
Probability
Phase 1 Phase 2 Mean
59 0 0
MS 14.5
MD 13.6
LV 73.6
CLV
SF
RF 0.0
INTERZEAG
Seven-in-One
OCTOPUS 301
V 6.04c
Medical Ophthalmic Center
Moustafa Nassar, Randa Zazaa
Azza
02/08/1960
43
female
-0.5 / /
6/24
10
POAG
Left (OS) / 4.2
30/08/2003 02:44 PM
3:41
G1
/ 1
TOP / Normal
III / 100 ms
10 cd/m²
69 / 0
pos 0 / 3, neg 0 / 4
C:\Program Files\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
59 0 0
MS 12.5
MD 15.7
LV 68.2
CLV
SF
RF 0.0
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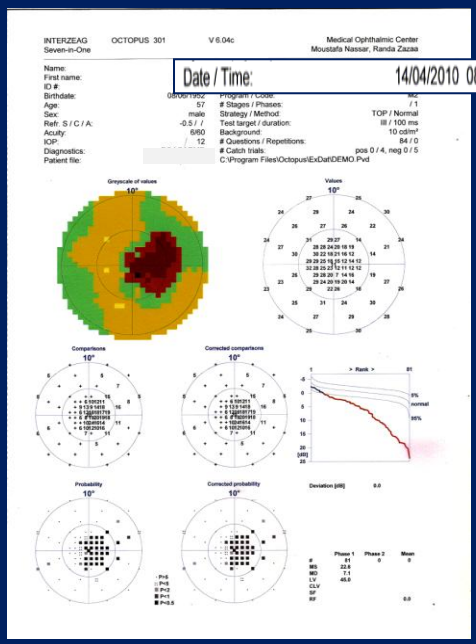
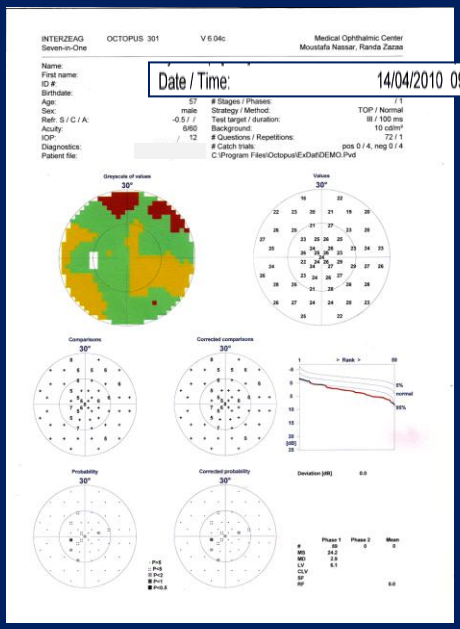
Abnormal Field Discrepancies





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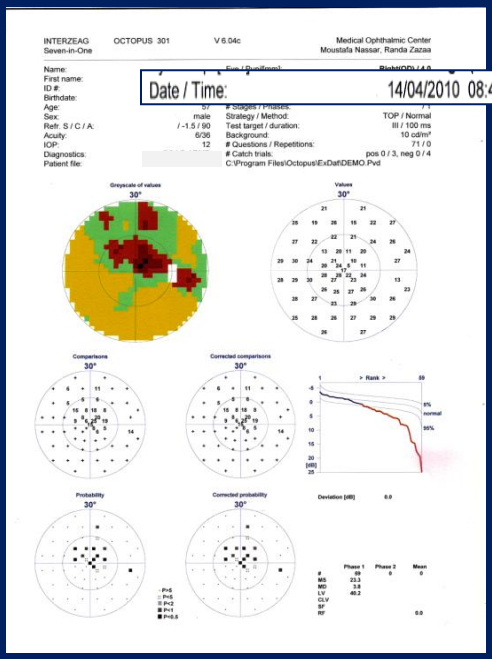

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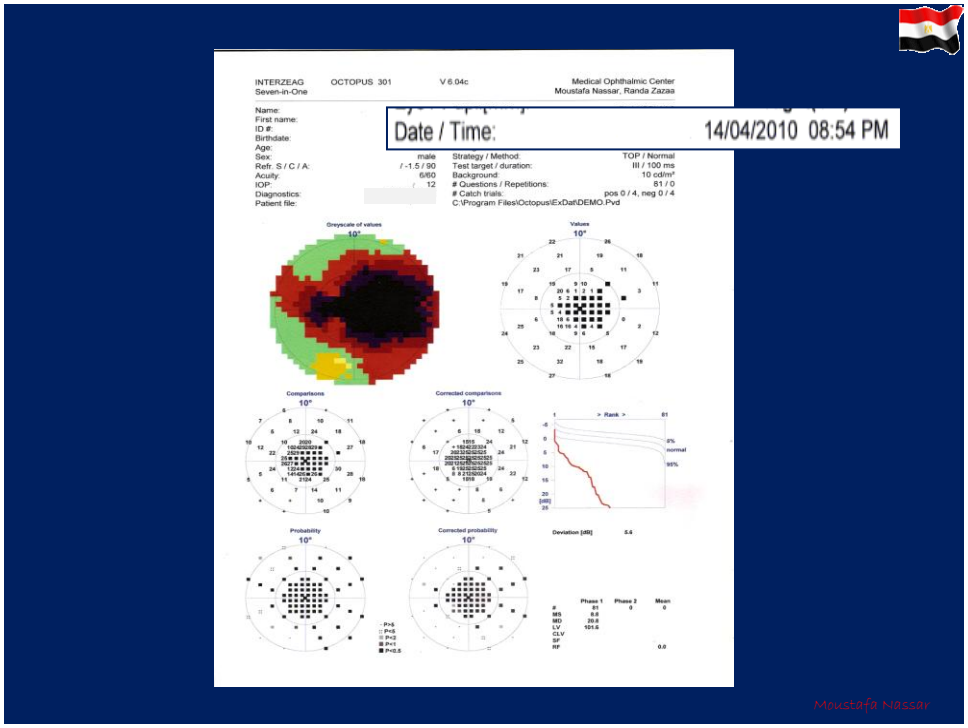
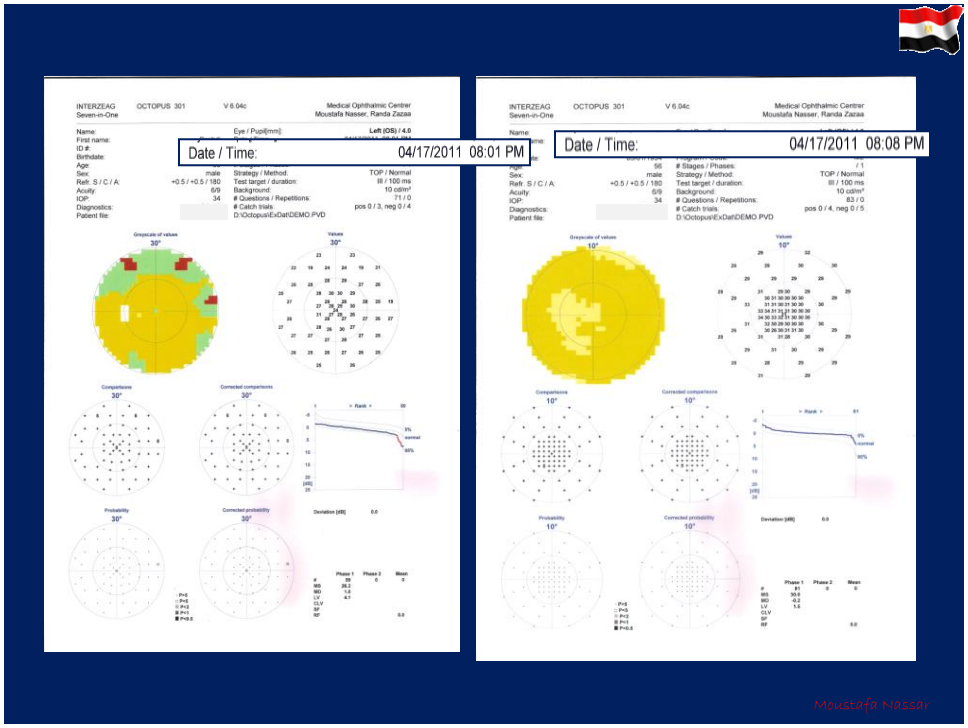
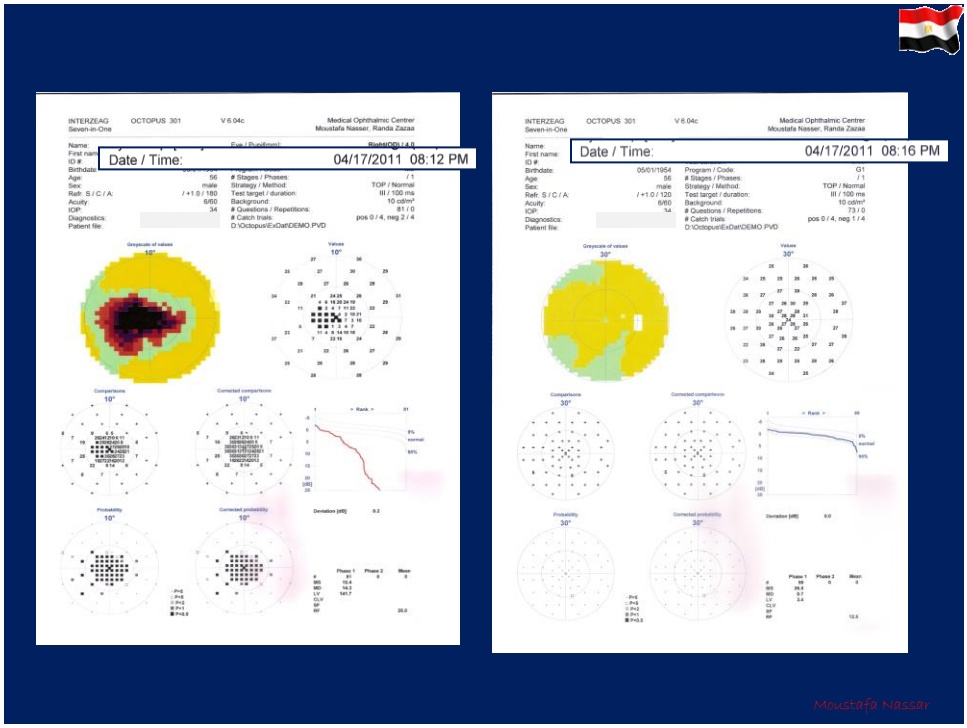
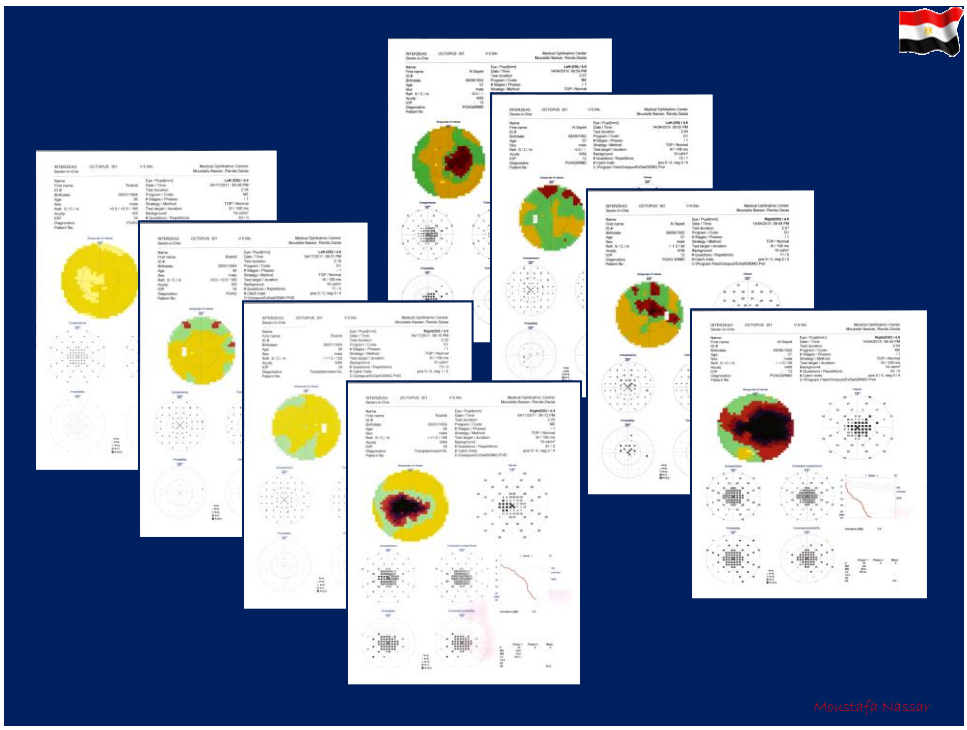

INTERZEAG
Seven-in-One
OCTOPUS 301
V 6.04c
Medical Ophthalmic Center
Moustafa Nassar, Randa Zazaa
Date / Time:
14/04/2010 08:54 PM
Moustafa Nassar

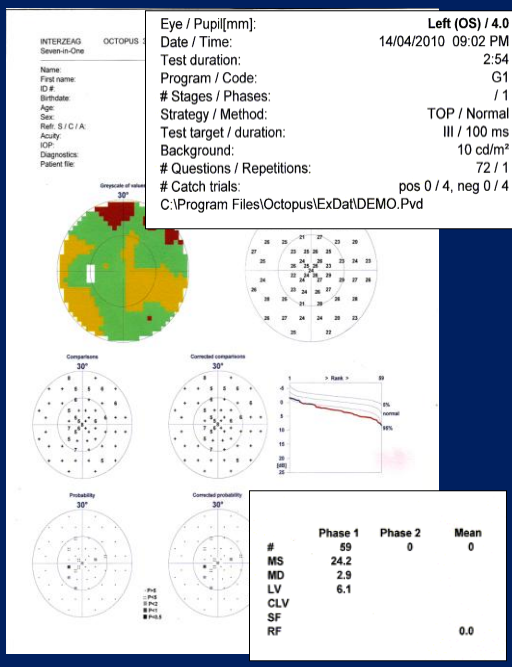

INTERZEAG
Seven-in-One
OCTOPUS 301
V 6.04c
Medical Ophthalmic Center
Moustafa Nasser, Randa Zazaa
Date / Time:
04/17/2011 08:01 PM
Date / Time:
04/17/2011 08:08 PM
Moustafa Nassar

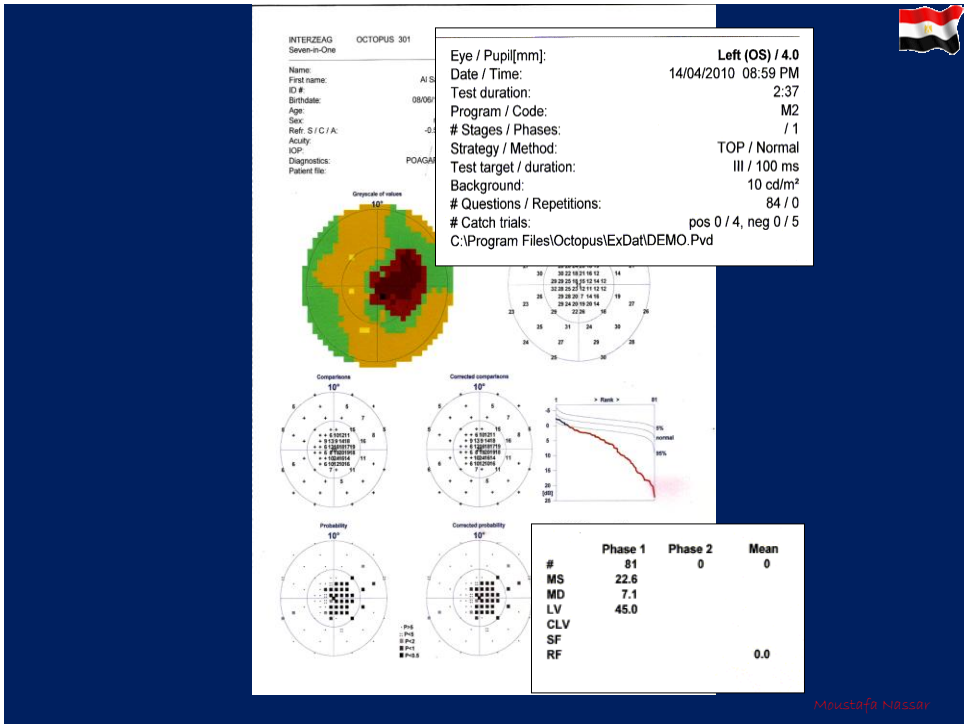

INTERZEAG
OCTOPUS 301
V 6.04c
Medical Ophthalmic Centrer
Seven-in-One
Moustafa Nasser, Randa Zazaa
Date / Time:
04/17/2011 08:12 PM
INTERZEAG
OCTOPUS 301
V 6.04c
Medical Ophthalmic Centrer
Seven-in-One
Moustafa Nasser, Randa Zazaa
Date / Time:
04/17/2011 08:16 PM
Moustafa Nassar

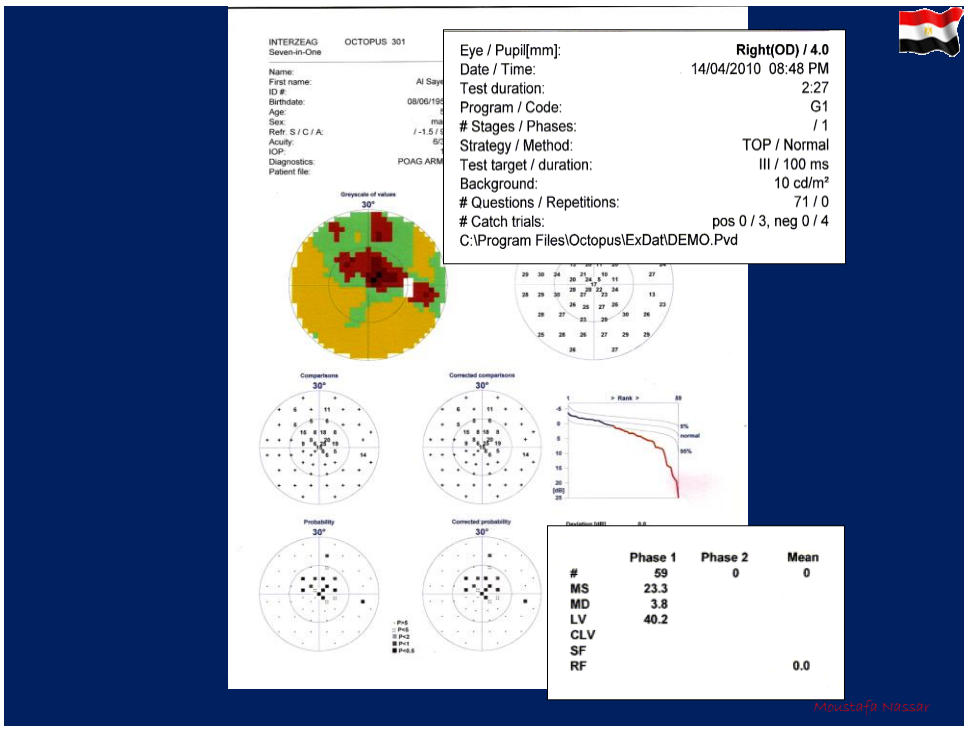

Moustafa Nassar

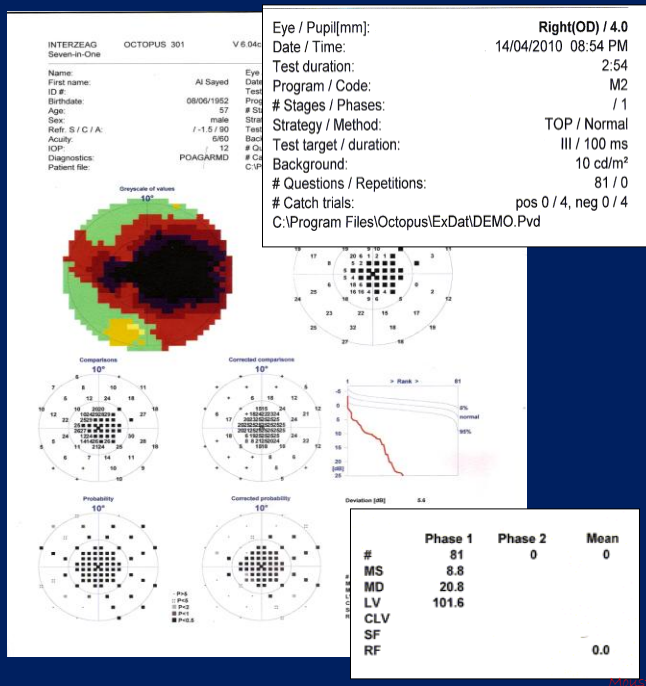
CASE # 1

POAG ARMD




INTERZEAG OCTOPUS 301
Seven-in-One
Eye / Pupil[mm]: Left (OS) / 4.0
Date / Time: 14/04/2010 08:59 PM
Test duration: 2:37
Program / Code: M2
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 84 / 0
Catch trials: pos 0 / 4, neg 0 / 5
C:\Program Files\Octopus\ExDat\DEMO.Pvd
Phase 1 Phase 2 Mean
81 0 0
MS 22.6
MD 7.1
LV 45.0
CLV
SF
RF 0.0
Moustafa Nassar


INTERZEAG OCTOPUS 301
Seven-in-One
Eye / Pupil[mm]: Right(OD) / 4.0
Date / Time: 14/04/2010 08:48 PM
Test duration: 2:27
Program / Code: G1
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 71 / 0
Catch trials: pos 0 / 3, neg 0 / 4
C:\Program Files\Octopus\ExDat\DEMO.Pvd
Phase 1 Phase 2 Mean
59 0 0
MS 23.3
MD 3.8
LV 40.2
CLV
SF
RF 0.0
Moustafa Nassar



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CASE # 2

OU: POAG

OD: TOXOPLASMOSIS

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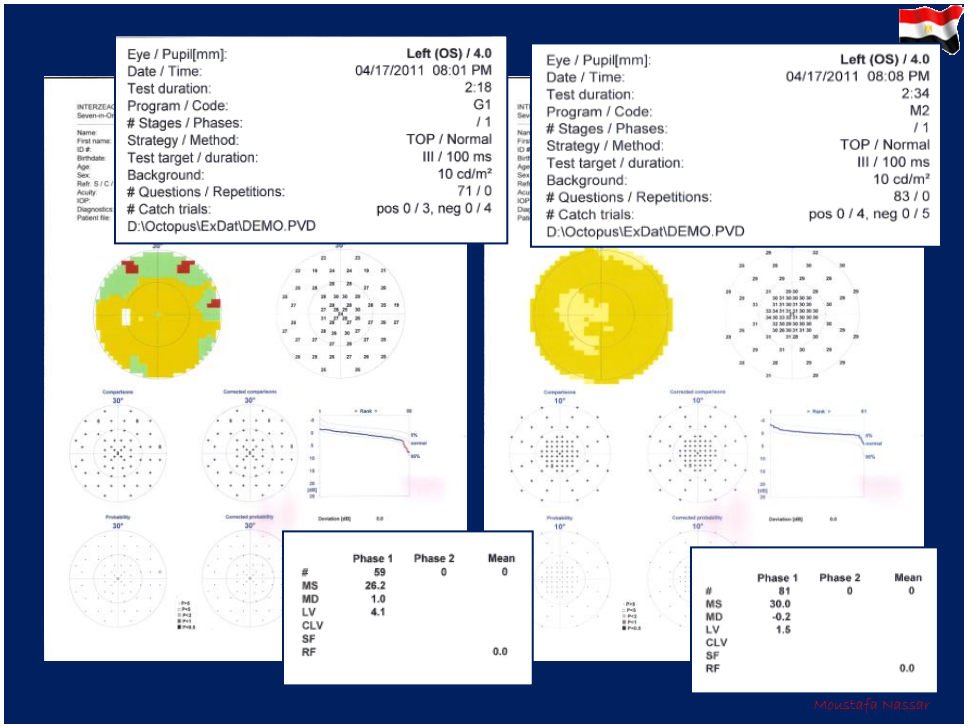
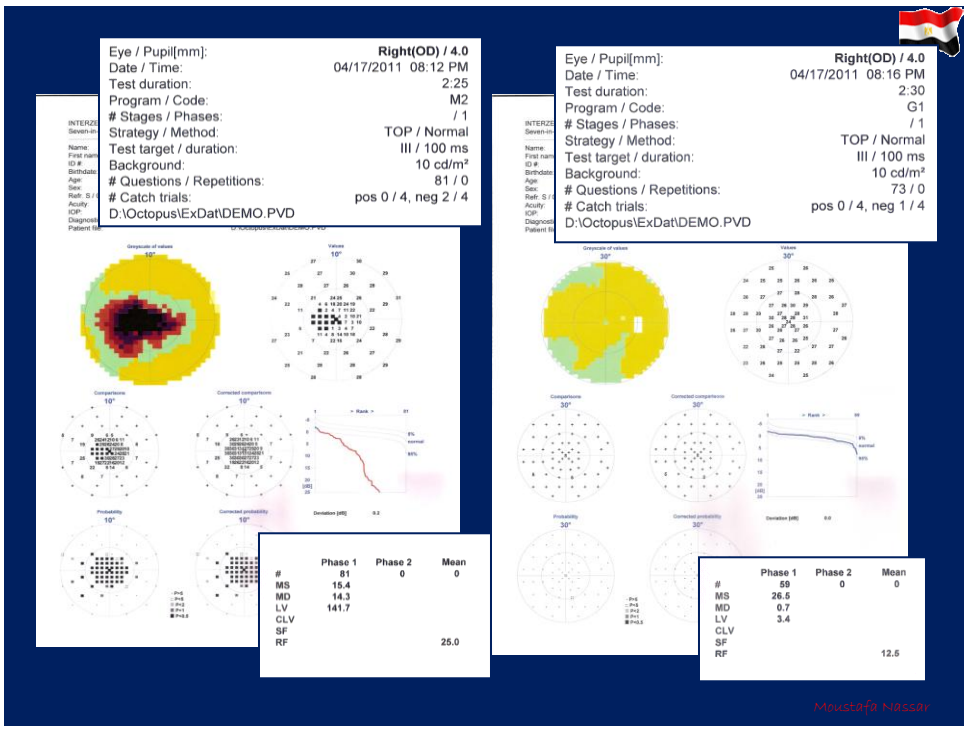

Eye / Pupil[mm]: Left (OS) / 4.0
Date / Time: 04/17/2011 08:01 PM
Test duration: 2:18
Program / Code: G1
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 71 / 0
Catch trials: pos 0 / 3, neg 0 / 4
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
59 0 0
MS 26.2
MD 1.0
LV 4.1
CLV
SF
RF 0.0
Eye / Pupil[mm]: Left (OS) / 4.0
Date / Time: 04/17/2011 08:08 PM
Test duration: 2:34
Program / Code: M2
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 83 / 0
Catch trials: pos 0 / 4, neg 0 / 5
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
81 0 0
MS 30.0
MD -0.2
LV 1.5
CLV
SF
RF 0.0
Moustafa Nassar


Eye / Pupil[mm]: Right(OD) / 4.0
Date / Time: 04/17/2011 08:12 PM
Test duration: 2:25
Program / Code: M2
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 81 / 0
Catch trials: pos 0 / 4, neg 2 / 4
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
81 0 0
MS 15.4
MD 14.3
LV 141.7
CLV
SF
RF 25.0
Eye / Pupil[mm]: Right(OD) / 4.0
Date / Time: 04/17/2011 08:16 PM
Test duration: 2:30
Program / Code: G1
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 73 / 0
Catch trials: pos 0 / 4, neg 1 / 4
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
59 0 0
MS 26.5
MD 0.7
LV 3.4
CLV
SF
RF 12.5
Moustafa Nassar

CASE # 3

OU : NTG (neuroprotection)

OS : MACULAR DEGENERATION

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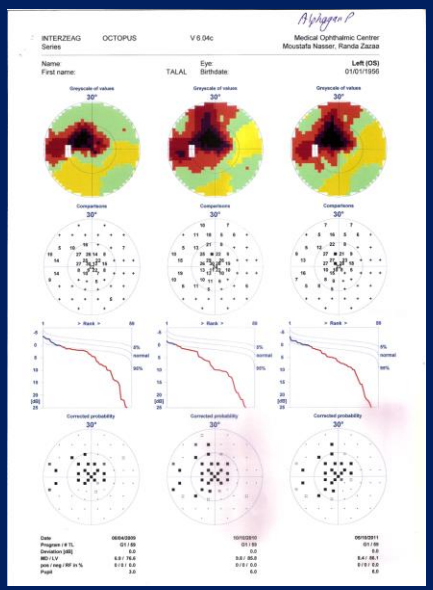

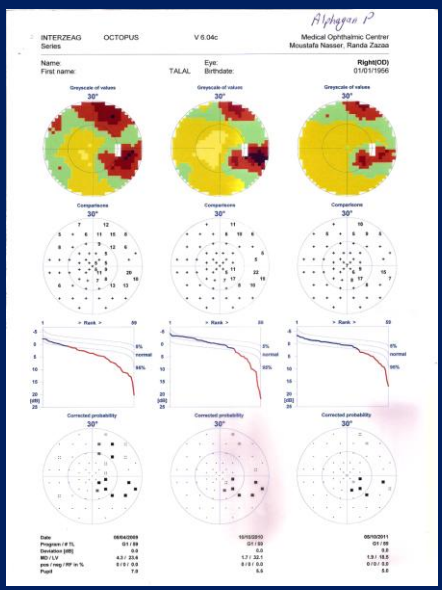

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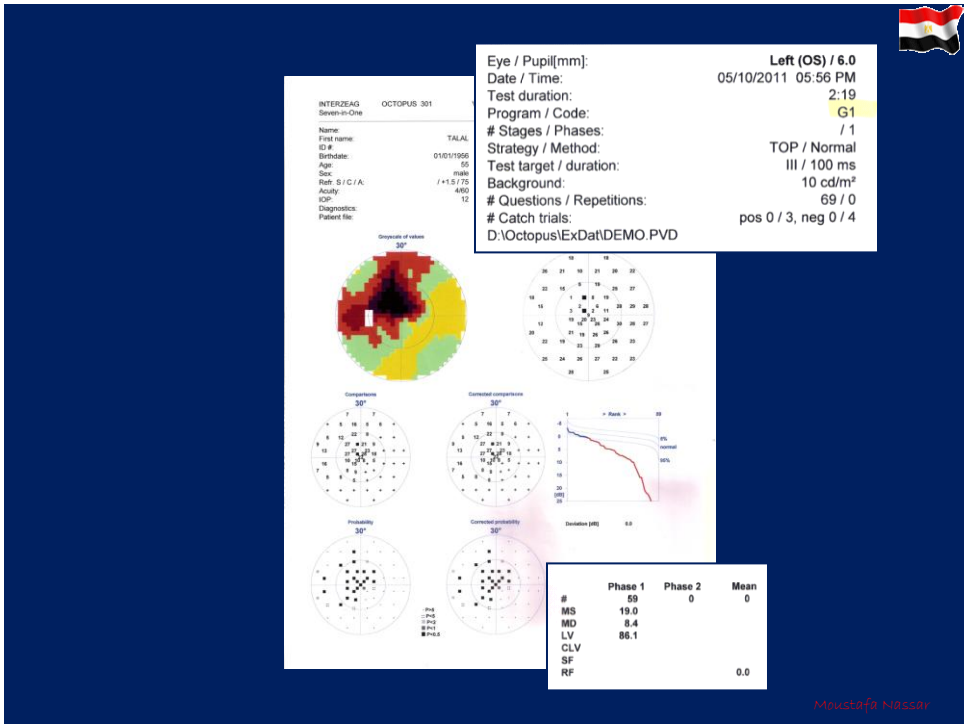
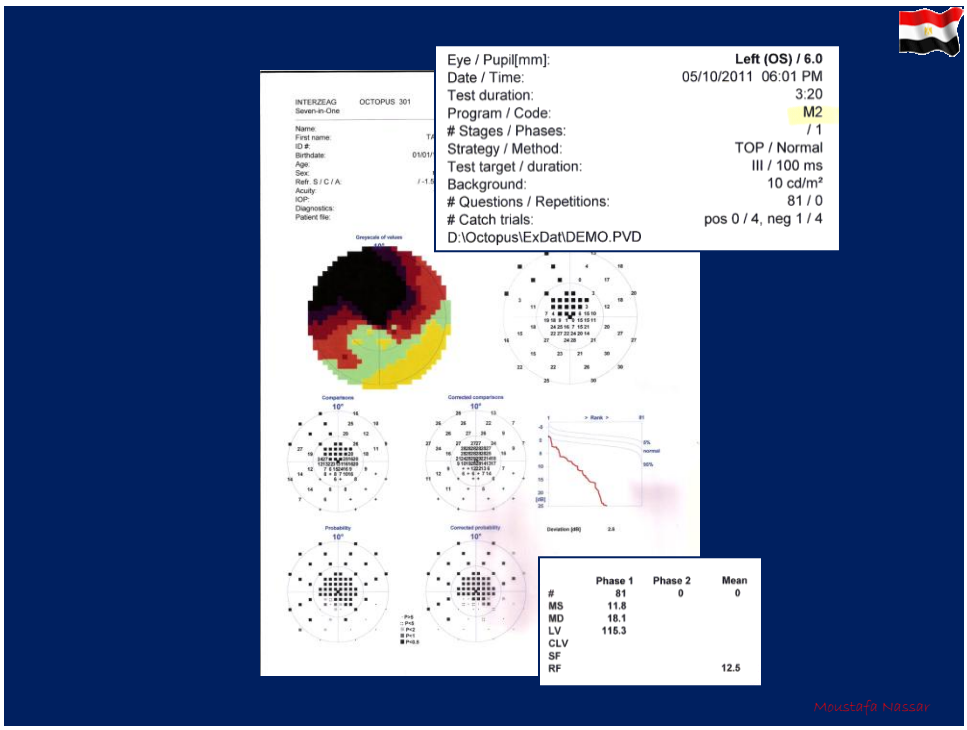
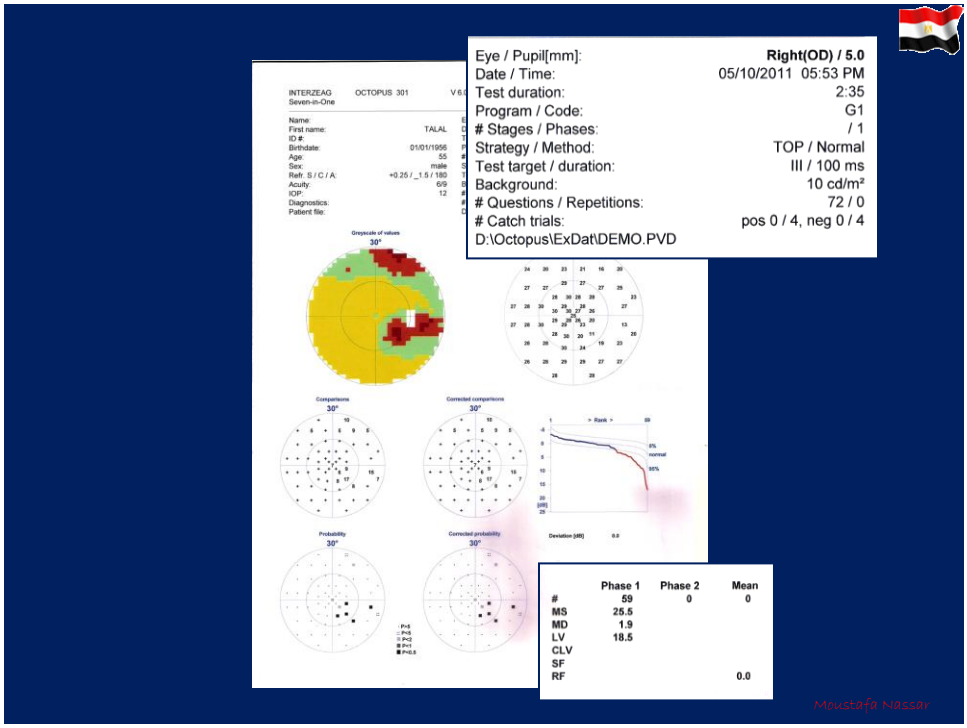

Eye / Pupil[mm]: Left (OS) / 6.0
Date / Time: 05/10/2011 05:56 PM
Test duration: 2:19
Program / Code: G1
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 69 / 0
Catch trials: pos 0 / 3, neg 0 / 4
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
59 0 0
MS 19.0
MD 8.4
LV 86.1
CLV
SF
RF 0.0
Moustafa Nassar


Eye / Pupil[mm]: Left (OS) / 6.0
Date / Time: 05/10/2011 06:01 PM
Test duration: 3:20
Program / Code: M2
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 81 / 0
Catch trials: pos 0 / 4, neg 1 / 4
D:\Octopus\ExDat\DEMO.PVD
Phase 1 Phase 2 Mean
81 0 0
MS 11.8
MD 18.1
LV 115.3
CLV
SF
RF 12.5
Moustafa Nassar


INTERZEAG OCTOPUS 301
Seven-in-One
Name:
First name: TALAL
ID #:
Birthdate: 01/01/1956
Age: 55
Sex: male
Refr. S / C / A: +0.25 / _1.5 / 180
Acuity: 6/9
IOP: 12
Diagnostics:
Patient file:
Eye / Pupil[mm]: Right(OD) / 5.0
Date / Time: 05/10/2011 05:53 PM
Test duration: 2:35
Program / Code: G1
Stages / Phases: / 1
Strategy / Method: TOP / Normal
Test target / duration: III / 100 ms
Background: 10 cd/m²
Questions / Repetitions: 72 / 0
Catch trials: pos 0 / 4, neg 0 / 4
D:\Octopus\ExDat\DEMO.PVD
Greyscale of values
30°
Comparisons
30°
Corrected comparisons
30°
> Rank >
95%
normal
Deviation [dB]
Probability
30°
Corrected probability
30°
P<5
P<2
P<1
P<0.5
Phase 1 Phase 2 Mean
59 0 0
MS 25.5
MD 1.9
LV 18.5
CLV
SF
RF 0.0
Moustafa Nassar


على مصر
Thanks
Moustafa Nassar