Frey

Frey AP-300
Humphrey Zeiss HFA II 740 perimeters

COMPARISON of the results of visual field testing according to the 30-2 test pattern using Frey AP-300 and Humphrey Zeiss HFA II 740 perimeters in patients with different stages of glaucomatous optic neuropathy.

Marek Ćwirko, MD. PhD
Ophthalmology Clinical Center Spectrum, Wrocław.

keeping an eye on the vision

October 2017

INTRODUCTION

Perimetry

have evolved since mid 19th century, from what was initially termed 'campimetry' [von Graefe A.: Ueber die Untersuchung des Gesichtsfeldes bei amblyopischen Affectionen. Archiv für Ophthalmologie 1856, 2: 258-298], followed by kinetic perimetry using an arc perimeter [Aubert H., Foerster R.: Untersuchungen über den Raumsinn der Retina. Archiv für Ophthalmologie 1857, 3: 1-37], and a semi-circle perimeter [Scherk S.: Ein neuer Apparat zur Messung des Gesichtsfeldes. Klin. Monatsbl. Augenheilkd. 1872, 10: 151-163]. In 1945, Hans Goldmann devised a hemisphere-shaped perimeter offering standardized, adjustable background luminance as well as adaptable size and intensity of targets [Goldmann H.: Ein selbsregistrierendes Projectionskugel-perimeter.

Ophthalmologica 1945, 109: 71-79].

The test parameters used in Goldmann's perimeter have become the testing standard used to this day in both kinetic and static perimetry.

PERIMETRY is the technique used to

- measure the extent of the visual field
- assess the sensitivity of the visual system to stimuli presented within the visual field [IPS Standards and Guidelines 2010

http://www.perimetry.org/GENINFO/standards/IPS-Standards-2010.HTM)

It allows for detection and assessment of damage to the visual system, from the eyeball, through the visual nerve and the visual pathway, to the visual cortex. Perimetry is also used to examine the extent and degree of damage to the visual system, while a series of tests enables to detect progression of the visual field defect over time.

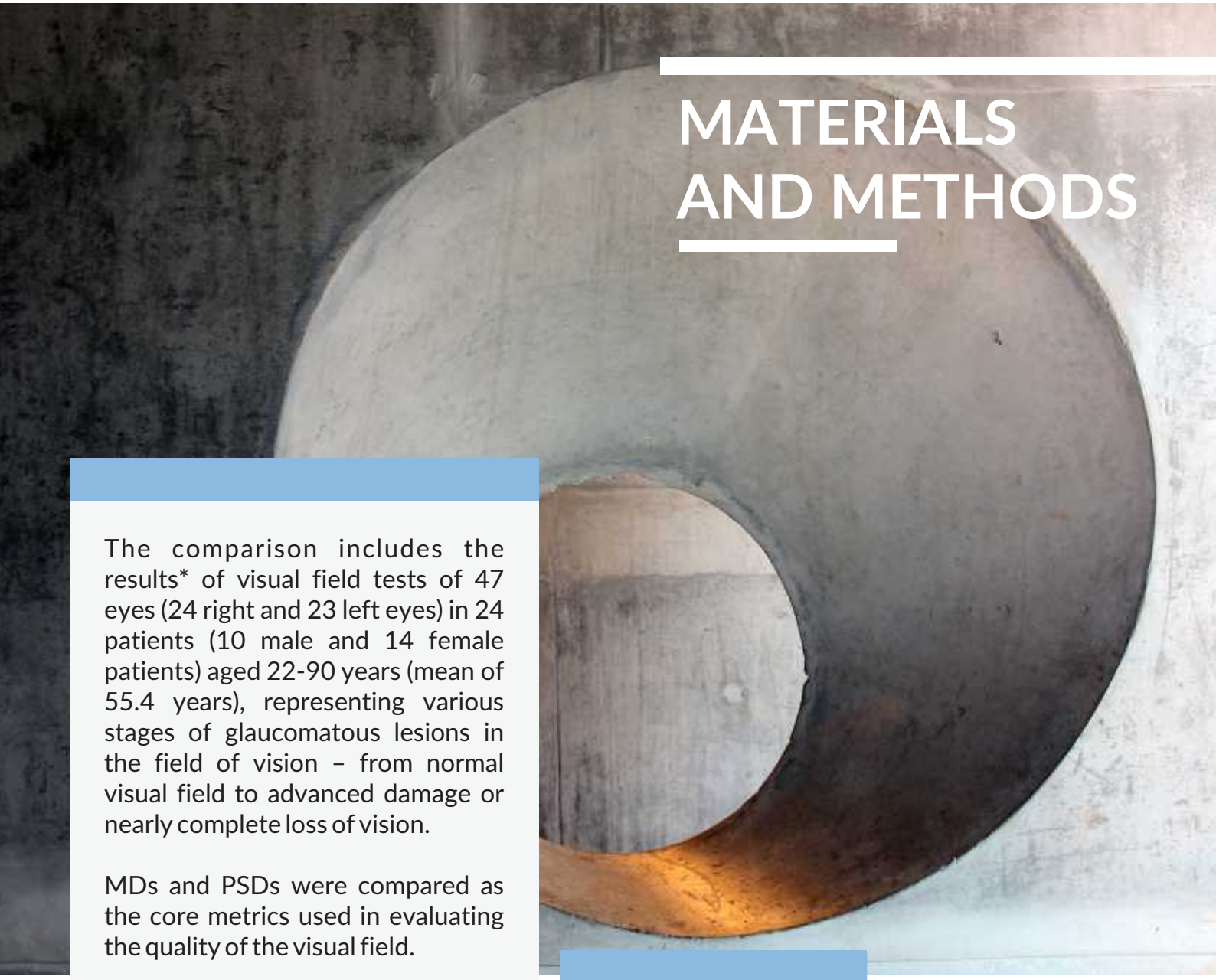
Comparable testing parameters

- the size and intensity of targets
- background luminance
- specific pattern of locations

are necessary to produce comparable results of visual field testing using various models of visual field analyzers.

RESEARCH OBJECTIVE

This paper compares the results of the 30-2 visual field test pattern used in patients with different stages of glaucomatous optic neuropathy, performed with the use of Frey AP-300 and Humphrey Zeiss HFA II 740 perimeters.



MATERIALS AND METHODS

The comparison includes the results* of visual field tests of 47 eyes (24 right and 23 left eyes) in 24 patients (10 male and 14 female patients) aged 22-90 years (mean of 55.4 years), representing various stages of glaucomatous lesions in the field of vision – from normal visual field to advanced damage or nearly complete loss of vision.

MDs and PSDs were compared as the core metrics used in evaluating the quality of the visual field.

The 30-2 testing protocol was used for visual field analysis, with the SITA Standard strategy to determine the sensitivity threshold for Humphrey Zeiss HFA II 740, and the Fast Treshold strategy for Frey AP-300.

All examined patients were experienced in the visual field testing and had a history of at least two previous visual field examinations.

47 eyes

24 patients

aged 22-90 years

*data on file.

RESULTS

DIAGRAM 1.

Diagram 1 shows the correlation between MDs obtained with Frey AP-300 versus Humphrey Zeiss HFA II 740 perimeter.

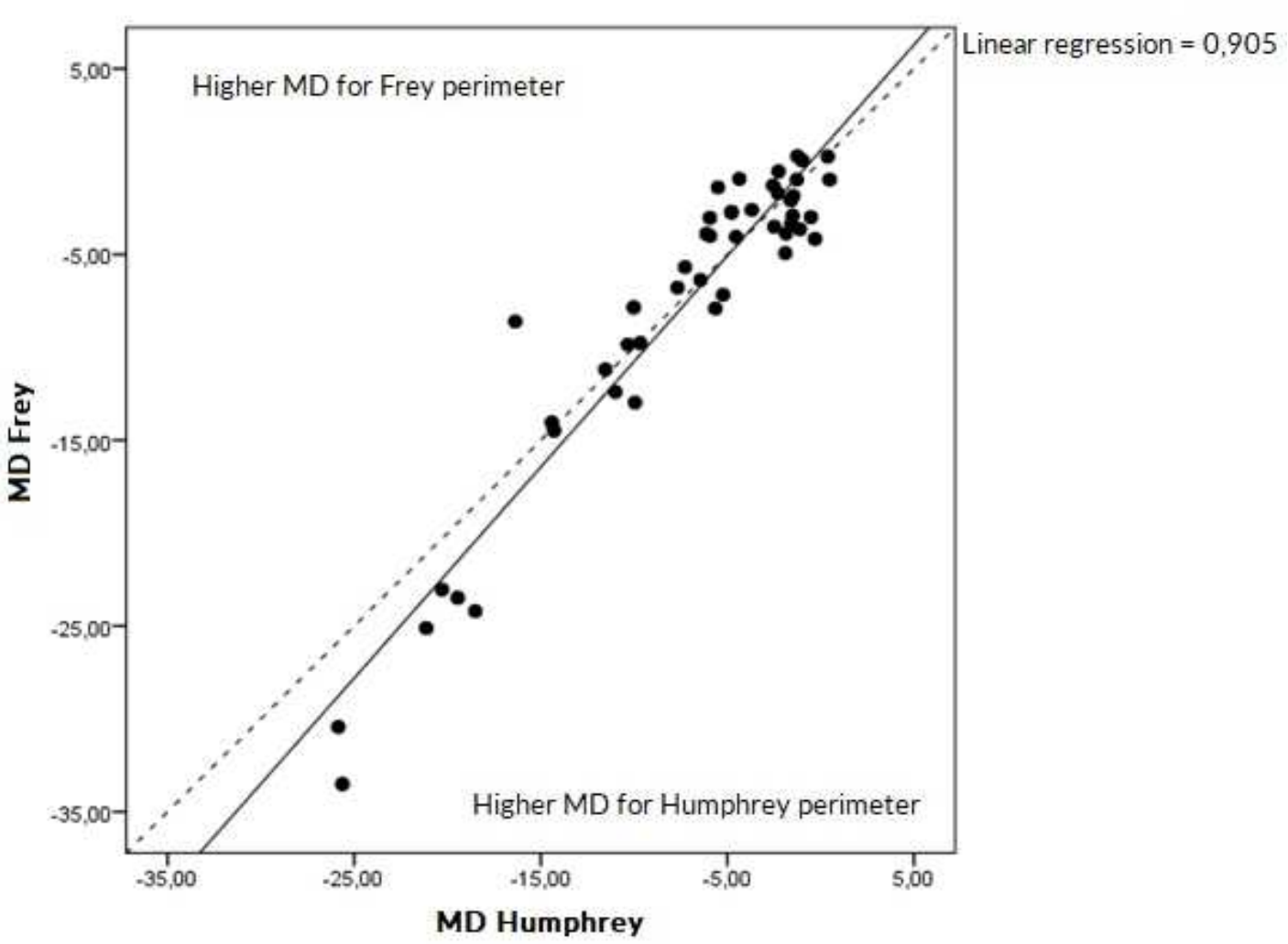


Diagram 2. Correlation between PSDs for Frey AP-300z versus Humphrey Zeiss HFA II 740Humphrey perimeters. Dotted line indicates proportionality (y=x), while the continuous line represents the trend.

Examples of visual field plots representing various degrees of glaucomatous damage examined with the visual field analyzers shown at the end of this paper.

RESULTS

DIAGRAM 2.

Diagram 2 illustrates the relationship between PSDs measured with Frey AP-300 versus Humphrey Zeiss HFA II 740 perimeter.

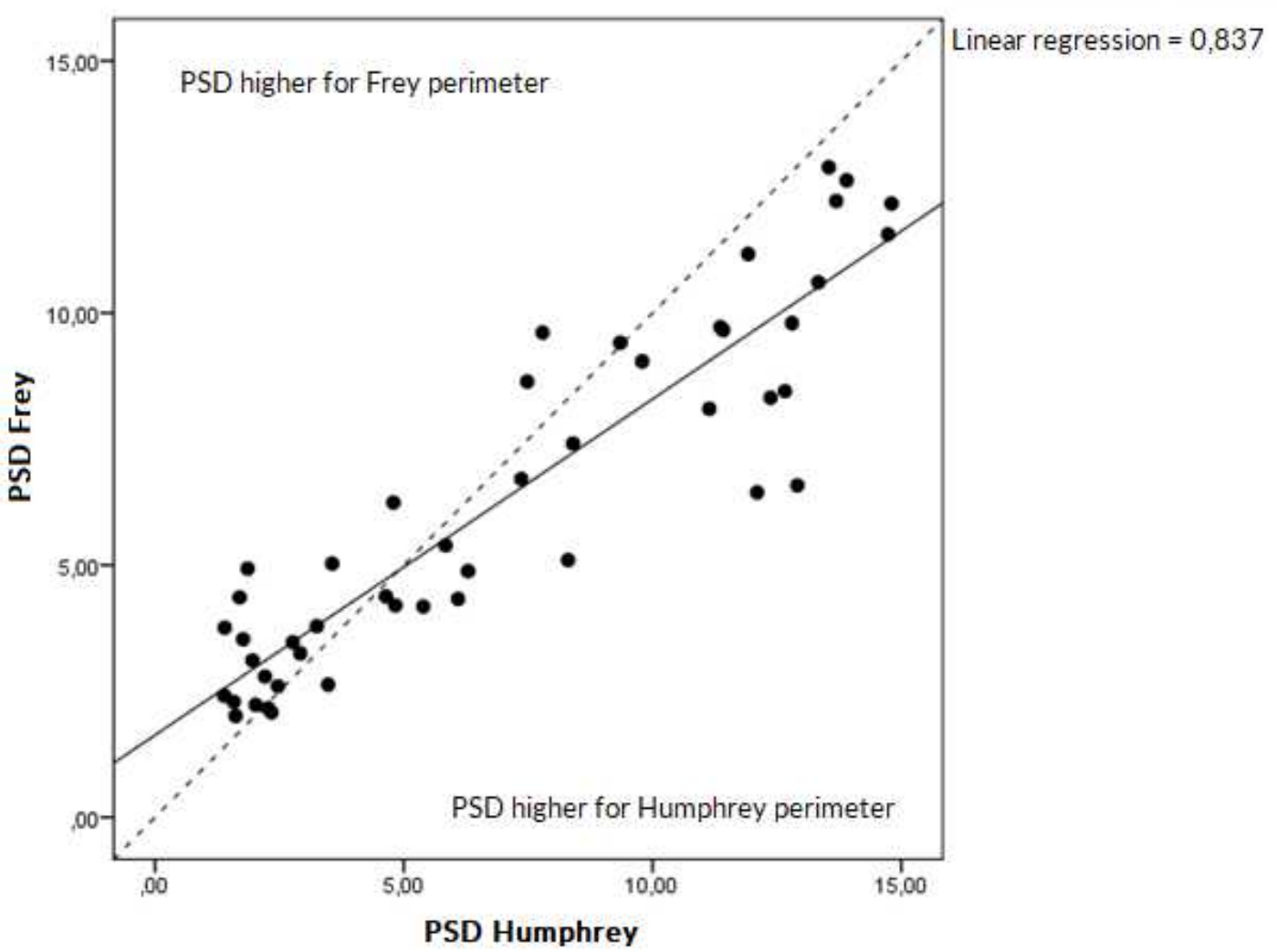


Diagram 1. Correlation between MDs for Frey AP-300 versus Humphrey Zeiss HFA II 740 perimeters. Dotted line indicates proportionality (y=x), while the continuous line represents the trend.

DISCUSSION AND CONCLUSIONS

Comparable parameters – size and luminance of targets, background luminance, and the same pattern of locations – are necessary to obtain comparable results of visual field tests performed with the use of different perimeters.

Both test parameters meet the standards determined for the Goldmann perimeter

- the target size is given in Roman numerals between 0 to V, corresponding to the area of 1/16, 1/4, 1, 4, 16, and 64 mm2
- background luminance of 31.5 asb (10 cd/m2)
- maximum target luminance of 10000 asb

Luminance is a photometric measure of area density of luminous intensity, reflecting the subjective impression of brightness. The SI unit for luminance is cd/m2 (candela per square meter); in literature sources, luminance is also expressed in apostilbs (asb).

1 asb = 0.31831 cd/m2 (formula 1)

The ability to differentiate the luminance of the target and the background luminance is referred to as the contrast retinal sensitivity. In a normal visual field, the retinal sensitivity in the fovea centralis is more than one thousand times higher than in the periphery of the retina. Because of this difference, the retinal sensitivity in static perimetry is expressed on a logarithmic scale in decibel [dB] units, most prominently used in acoustics. The maximum luminance of the target in a given model of a perimeter is used as a reference value, corresponding to 0dB sensitivity.

Sensitivity (dB) = 10 log10 Lmax / Ln (formula 2)

where:

Lmax - maximum luminance of the target (depending on the type of the perimeter)

Ln - luminance of the threshold stimulus

DISCUSSION AND CONCLUSIONS

As defined in formula 2, if the retina detects only targets of maximum luminance (Lmax / Ln = 1), then the retinal sensitivity equals 0dB. If the luminance value of the threshold target is 10 (Lmax / Ln = 10) or 1000 times lower than the maximum luminance of the target, then the retinal sensitivity at the target is 10 dB and 30 dB, respectively.

The correct number and pattern of locations are selected through compromising the desire to achieve better testing accuracy by using a very dense grid of points, and the acceptable test duration, which increases with the number of tested points, thereby reducing the accuracy of test results [Weber J., Dobek K.: What is the most suitable grid for computer perimetry in glaucoma patients? Ophthalmologica 1986, 192: 88-96].

Visual field analysis in glaucoma relies primarily on the 30-2 perimetry test pattern, in which the locations are arranged on a rectangular grid covering a central 60 degree field of view (30 degree from fixation) at 6 degree intervals. This is the test program used in this study.

A high correlation between MDs and PSDs, as well as major similarities between gray-scale plots of the visual field and probability maps were demonstrated in a comparative analysis of the results of visual field testing run on Frey AP-300 versus Humphrey Zeiss HFA II 740.

When more severely damaged visual fields (MD < -15dB) were tested, Frey AP-300 produced slightly lower MD values (demoting more significant visual field damage) as compared to Humphrey Zeiss HFA II 740.

With the progressively increasing irregularity of the slope of the hill of vision, PSDs produced by Frey AP-300 were slightly lower (denoting smaller irregularities) as compared to Humphrey Zeiss HFA II 740.

The slight differences in MDs and PSDs can be attributed to the use of different strategies with which the test sensitivity threshold was determined, i.e. SITA Standard for Humphrey Zeiss HFA II 740 and Fast Threshold strategy for Frey AP- 300. The strategies used in the present study are most frequently used in clinical practice in order to reduce the test duration (mean test duration with Frey AP- 300: 6min. 4s, Humphrey Zeiss HFA II 740: 7min. 46s), which translates into a slight reduction in the testing accuracy.

DISCUSSION AND CONCLUSIONS

There is a large body of evidence demonstrating minor differences in the threshold values of retinal light sensitivity using the threshold strategies and the SITA strategy [Bengtsson B., Heijl A.: Comparing significance and magnitude of glaucomatous visual field defects using the SITA and Full Threshold strategies. Acta Ophthalmol Scand 1999, 77: 143-146.] [Roggen X., Herman K., Van Malderen L., Devos M., Spileers W.: Different strategies for Humphrey automated perimetry: FASTPAC, SITA standard and SITA fast in normal subjects and glaucoma patients. Bull Soc Belge Ophtalmol. 2001, 279: 23-33.], having no impact on the clinical value of both types of these strategies.

The present study revealed major similarities between the graphical presentation of test results obtained from both visual field analyzers. Thus, it is easier to quickly compare the test results and evaluate abnormalities in the visual field without having to recalculate the data, as is the case in comparisons of visual fields tested with the popular Octopus visual field analyzers [Zeyen T., Roche M., Brigatti L., Caprioli J.: Formulas for conversion between Octopus and Humphrey threshold values and indices. Graefe's Arch Clin Exp Ophthalmol 1995, 233: 627-634].

Single Field Analysis | Eye: Left

Name: | ID: 46100401987 | DOB: 04-10-1946

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 4/15
False POS Errors: 0%
False NEG Errors: 62%
Test Duration: 00:05:31

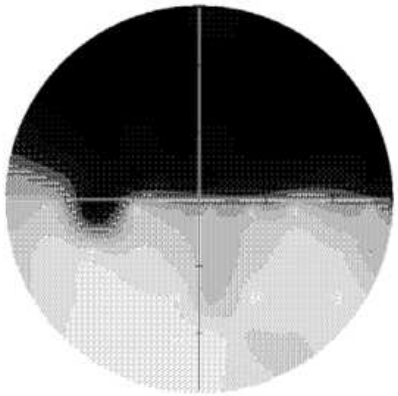
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: -1,75

Date: 11-07-2014
Time: 10:42:02
Age: 67

Fovea: -

		<0	<0	2	<0				
	<0	<0	<0	<0	<0	<0			
<0	<0	<0	<0	<0	<0	<0	<0		
5	0	<0	0	<0	0	<0	<0	<0	<0
15	10	0	<0	0	<0	0	0	3	<0
18	22	△	24	17	18	21	23	16	21
21	25	26	23	22	17	21	25	23	16
	23	28	26	26	17	27	24	26	
		28	28	29	28	21	22		
			28	26	26	23			



		-30	-30	-27	-30				
	-30	-30	-30	-30	-30	-30			
-30	-30	-30	-30	-30	-30	-30	-30		
-24	-29	-30	-30	-33	-32	-31	-30	-30	-30
-14	-19	-29	-33	-34	-35	-32	-29	-26	-30
-11	-7		-8	-17	-16	-11	-6	-13	-8
-8	-4	-3	-7	-10	-15	-9	-4	-6	-13
	-6	-1	-3	-3	-12	-2	-5	-3	
		-1	-1	0	-1	-8	-7		
			-1	-3	-3	-6			

Total Deviation

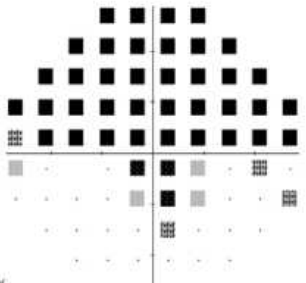
		-27	-27	-24	-27				
	-27	-27	-27	-27	-27	-27			
-27	-27	-27	-27	-27	-27	-27	-27		
-21	-26	-27	-27	-30	-29	-28	-27	-27	-27
-11	-16	-26	-30	-31	-32	-29	-26	-23	-27
-8	-4		-5	-14	-13	-8	-3	-10	-5
-5	-1	0	-4	-7	-12	-6	-1	-3	-10
	-3	2	0	0	-9	1	-2	0	
		2	2	3	2	-5	-4		
			2	0	0	-3			

Pattern Deviation

GHT
Hemifield depression

AP_MD: -24,20 dB
AP_PSD: 12,22 dB
AP_SF: -
AP_CPSD: -

Total Deviation



Pattern Deviation

P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Left

Name:
ID: 1946.1004.D989.9890.7EEC.6B62
DOB: 04-10-1946

Central 30-2 Threshold Test

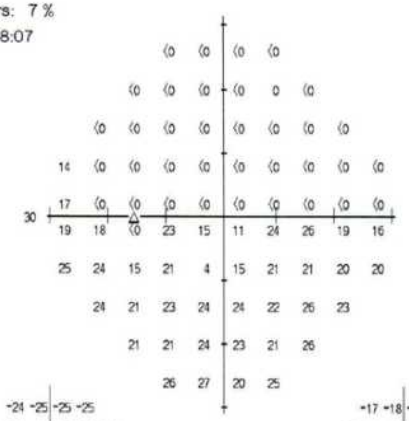
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 0/19
False POS Errors: 0 %
False NEG Errors: 7 %
Test Duration: 08:07

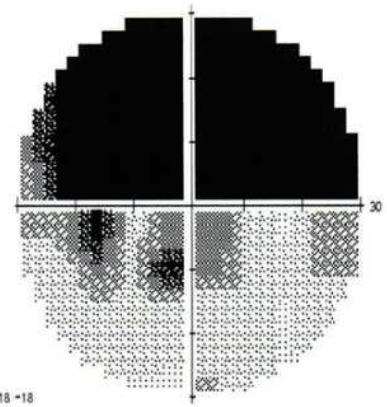
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: -2.25 DS DC X

Date: 11-07-2014
Time: 10:08
Age: 67

Fovea: OFF

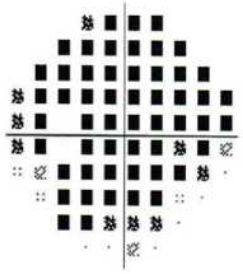




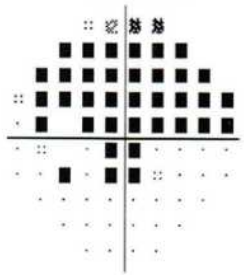
		-24	-25	-25	-25				
	-27	-28	-28	-28	-26	-27			
-28	-29	-30	-30	-31	-31	-31	-30	-26	
-13	-30	-31	-32	-32	-33	-32	-32	-30	-27
-11	-31		-33	-33	-34	-33	-33	-31	-28
-9	-12		-8	-16	-21	-8	-4	-10	-10
-4	-5	-15	-10	-27	-17	-10	-9	-8	-6
	-5	-8	-8	-7	-7	-8	-3	-4	
		-8	-9	-6	-6	-8	-1		
			-2	0	-7	-2			

		-17	-18	-18	-18				
	-20	-20	-21	-21	-19	-20			
-21	-22	-23	-23	-24	-24	-23	-21		
-6	-23	-24	-25	-25	-26	-25	-24	-23	-20
-4	-24		-26	-26	-27	-26	-25	-24	-21
-2	-5		-1	-9	-13	-1	3	-3	-3
3	2	-8	-3	-20	-9	-3	-2	-1	1
	2	-1	-1	0	0	-1	4	3	
		-1	-1	1	1	0	6		
			5	7	0	5			

Total Deviation



Pattern Deviation



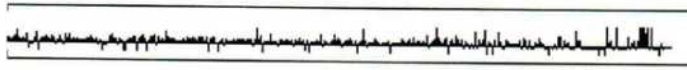
:: < 5%
⁙ < 2%
⁘ < 1%
■ < 0.5%

GHT
Outside Normal Limits

VFI 37%

MD -18.51 dB P < 0.5%
PSD 13.69 dB P < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 46100401987 | DOB: 04-10-1946

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 8/19
False POS Errors: 0%
False NEG Errors: 9%
Test Duration: 00:06:32

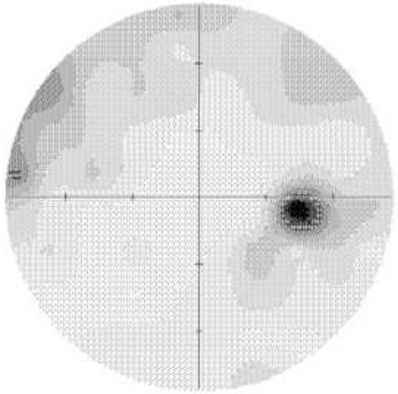
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: -2,75

Date: 11-07-2014
Time: 10:49:58
Age: 67

Fovea: -

			22	19	20	24			
		22	22	27	25	24	21		
	14	26	22	23	27	25	21	21	
16	22	23	27	29	29	26	27	29	25
11	25	21	28	31	30	31	25	27	23
23	28	30	30	31	30	31	△	20	22
26	25	30	27	31	28	19	27	23	30
	30	30	32	28	28	23	26	26	
		28	26	28	28	30	30		
			28	28	27	22			



Total Deviation

			-7	-10	-9	-5			
		-7	-7	-2	-4	-5	-8		
	-15	-3	-7	-6	-2	-4	-8	-8	
-13	-7	-6	-3	-3	-3	-4	-2	0	-4
-18	-4	-8	-4	-3	-4	-1	-4	-2	-6
-6	-1	1	-2	-3	-4	-1		-9	-7
-3	-4	1	-3	-1	-4	-11	-2	-6	1
	1	1	3	-1	-1	-6	-3	-3	
		-1	-3	-1	-1	1	1		
			-1	-1	-2	-7			

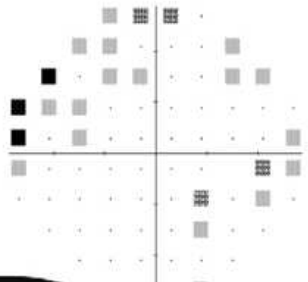
Pattern Deviation

			-6	-9	-8	-4			
		-6	-6	-1	-3	-4	-7		
	-14	-2	-6	-5	-1	-3	-7	-7	
-12	-6	-5	-2	-2	-2	-3	-1	1	-3
-17	-3	-7	-3	-2	-3	0	-3	-1	-5
-5	0	2	-1	-2	-3	0		-8	-6
-2	-3	2	-2	0	-3	-10	-1	-5	2
	2	2	4	0	0	-5	-2	-2	
		0	-2	0	0	2	2		
			0	0	-1	-6			

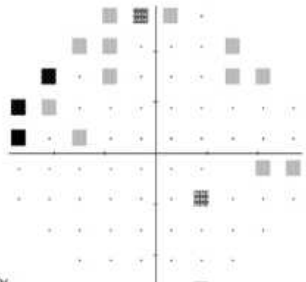
GHT
Zone defect

AP_MD: -4,05 dB
AP_PSD: 3,79 dB
AP_SF: -
AP_CPSD: -

Total Deviation



Pattern Deviation



P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1946.1004.D989.9890.7EEC.6B62

DOB: 04-10-1946

Central 30-2 Threshold Test

Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 1/19
False POS Errors: 1 %
False NEG Errors: 7 %
Test Duration: 08:46

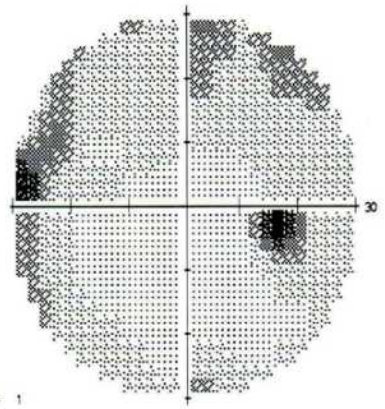
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: -1.75 DS DC X

Date: 11-07-2014
Time: 09:57
Age: 67

Fovea: OFF

			20	22	14	21			
		23	23	23	20	25	17		
	19	23	25	24	21	25	22	20	
21	12	27	25	24	25	25	23	24	24
30	1	24	24	26	28	29	27	23	22	22	30
	18	24	27	28	30	29	27	10	22	22	
	16	25	27	28	30	29	26	24	22	23	
		21	25	28	28	27	28	26	25		
			25	24	27	25	27	25			
				22	25	20	23				



			-3	-1	-9	-1			
		-2	-3	-3	-6	-1	-8		
	-7	-5	-4	-5	-8	-3	-5	-6	
-5	-16	-3	-6	-7	-6	-4	-6	-4	-3
-25	-5	-7	-6	-4	-3	-4		-7	-6
-9	-5	-4	-4	-2	-3	-4		-7	-6
-9	-3	-3	-4	-2	-3	-5	-7	-7	-6
	-6	-4	-2	-3	-3	-2	-3	-4	
		-2	-4	-2	-4	-3	-3		
			-4	-2	-8	-4			

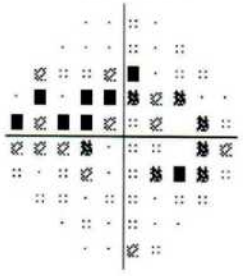
			0	2	-6	1			
		0	-1	-1	-4	2	-6		
	-5	-2	-1	-2	-5	-1	-2	-4	
-2	-14	0	-3	-4	-3	-2	-4	-1	-1
-23	-2	-4	-3	-1	0	-2		-4	-3
-6	-3	-1	-2	1	0	-1		-5	-3
-6	-1	-1	-1	1	0	-2	-4	-5	-3
	-3	-1	1	-1	-1	0	-1	-2	
		1	-2	1	-2	0	-1		
			-2	0	-5	-2			

GHT
Outside Normal Limits

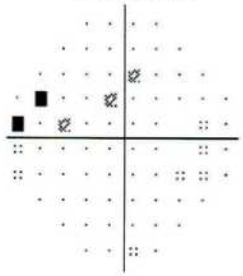
VFI 95%

MD -4.53 dB P < 1%
PSD 3.25 dB P < 5%

Total Deviation

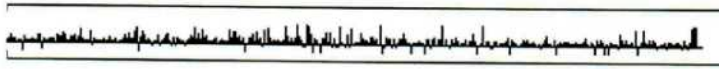


Pattern Deviation



:: < 5%
▨ < 2%
▩ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 84090711774 | DOB: 07-09-1984

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 0/17
False POS Errors: 11%
False NEG Errors: 0%
Test Duration: 00:04:56

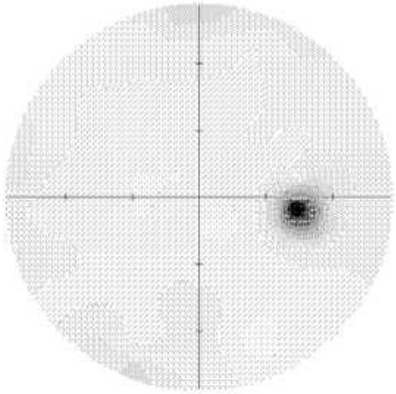
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: Nie

Date: 08-02-2014
Time: 11:03:31
Age: 29

Fovea: -

			28	23	24	26			
		29	31	30	31	32	28		
	31	32	32	32	32	32	30	29	
26	31	32	32	33	33	31	32	31	30
27	32	32	35	35	32	33	32	27	30
31	34	32	35	33	36	34	△	29	30
28	30	32	34	33	34	34	31	31	30
	33	32	32	30	31	33	33	33	
		28	33	31	31	37	33		
			23	29	29	33			



Total Deviation

			-3	-8	-7	-5			
		-2	0	-1	0	1	-3		
	0	1	1	1	1	1	-1	-2	
-5	0	1	0	-1	-1	-1	1	0	-1
-4	1	1	1	-1	-4	-1	1	-4	-1
0	3	1	1	-3	0	0		-2	-1
-3	-1	1	2	-1	0	2	0	0	-1
	2	1	1	-1	0	2	2	2	
		-3	2	0	0	6	2		
			-8	-2	-2	2			

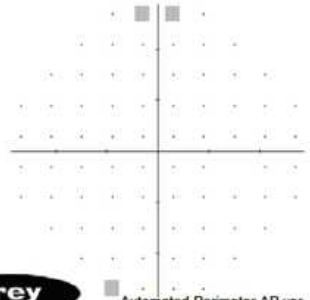
Pattern Deviation

			-4	-9	-8	-6			
		-3	-1	-2	-1	0	-4		
	-1	0	0	0	0	0	-2	-3	
-6	-1	0	-1	-2	-2	-2	0	-1	-2
-5	0	0	0	-2	-5	-2	0	-5	-2
-1	2	0	0	-4	-1	-1		-3	-2
-4	-2	0	1	-2	-1	1	-1	-1	-2
	1	0	0	-2	-1	1	1	1	
		-4	1	-1	-1	5	1		
			-9	-3	-3	1			

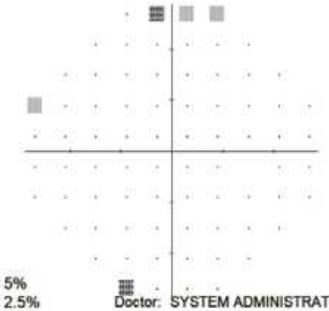
GHT
No zone defects

AP_MD: -0,53 dB
AP_PSD: 2,41 dB
AP_SF: -
AP_CPSD: -

Total Deviation



Pattern Deviation



P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1984.0907.E5F5.99C7.8D9D.7229
DOB: 07-09-1984

Central 30-2 Threshold Test

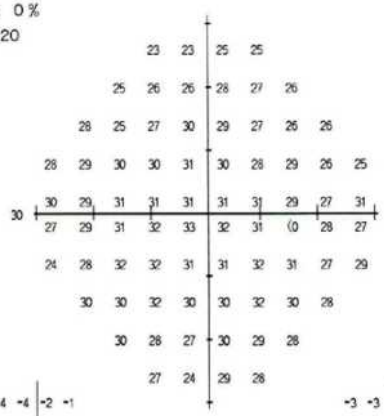
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 3/17
False POS Errors: 1 %
False NEG Errors: 0 %
Test Duration: 06:20

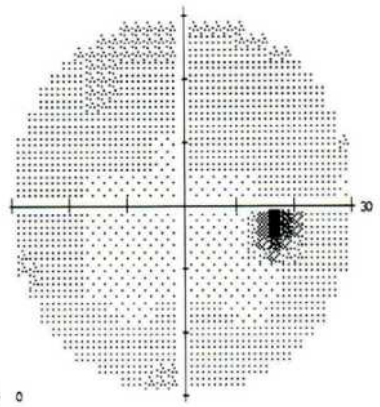
Fovea: OFF

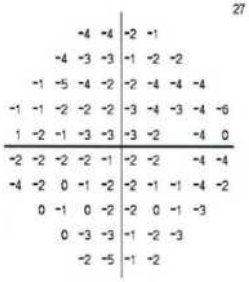
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

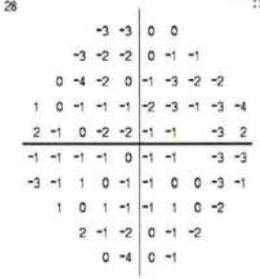
Pupil Diameter:
Visual Acuity:
RX: +0.00 DS DC X

Date: 08-02-2014
Time: 10:30
Age: 29







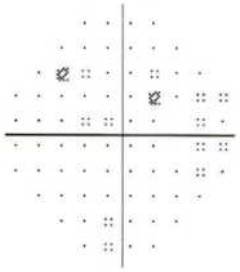


GHT
Within Normal Limits

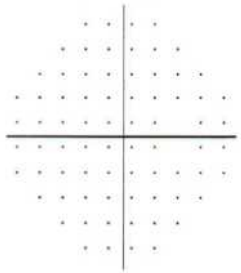
VFI 100%

MD -2.26 dB P < 5%
PSD 1.39 dB

Total Deviation

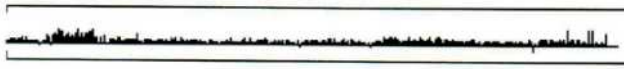


Pattern Deviation



:: < 5%
⁄⁄ < 2%
▒ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 78061901770 | DOB: 19-06-1978

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 8/20
False POS Errors: 8%
False NEG Errors: 16%
Test Duration: 00:06:31

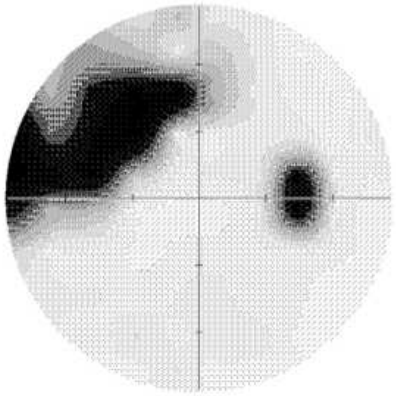
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: -0,75 DS

Date: 29-03-2014
Time: 10:33:59
Age: 35

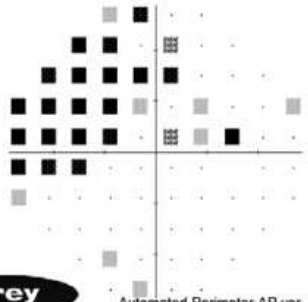
Fovea: -

		25	18	27	28				
		16	19	28	20	26	32		
	18	3	<0	<0	17	26	30	32	
<0	11	1	<0	28	30	26	27	34	25
<0	<0	<0	22	31	27	28	<0	30	32
5	19	19	33	33	34	29	△	31	34
23	30	30	33	30	29	30	31	31	32
	28	28	30	28	27	31	31	34	
		30	25	30	26	26	32		
			30	25	30	31			



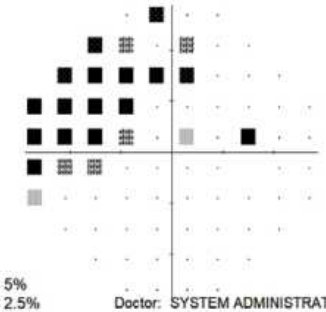
		-6	-13	-4	-3				
		-15	-12	-3	-11	-5	1		
	-13	-28	-32	-32	-14	-5	-1	1	
-32	-20	-30	-33	-6	-4	-6	-4	3	-6
-32	-32	-32	-12	-5	-9	-6	-32	-1	1
-26	-12	-12	-1	-3	-2	-5		0	3
-8	-1	-1	1	-4	-5	-2	0	0	1
	-3	-3	-1	-3	-4	0	0	3	
		-1	-6	-1	-5	-5	1		
			-1	-6	-1	0			

Total Deviation



		-5	-12	-3	-2				
		-14	-11	-2	-10	-4	2		
	-12	-27	-31	-31	-13	-4	0	2	
-31	-19	-29	-32	-5	-3	-5	-3	4	-5
-31	-31	-31	-11	-4	-8	-5	-31	0	2
-25	-11	-11	0	-2	-1	-4		1	4
-7	0	0	2	-3	-4	-1	1	1	2
	-2	-2	0	-2	-3	1	1	4	
		0	-5	0	-4	-4	2		
			0	-5	0	1			

Pattern Deviation



GHT
Zone defect

AP_MD: -9,77 dB
AP_PSD: 10,61 dB
AP_SF: -
AP_CPSD: -

P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1978.0619.000C.53D4.0D1D.947B | DOB: 19-06-1978

Central 30-2 Threshold Test

Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 2/21
False POS Errors: 0 %
False NEG Errors: 0 %
Test Duration: 07:20

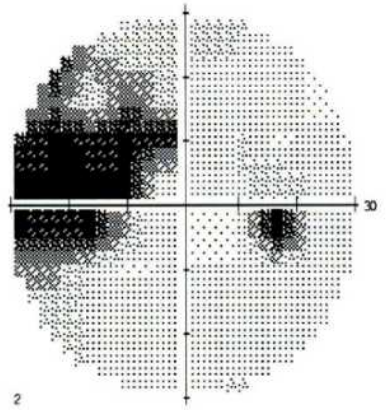
Fovea: OFF

Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: -0.75 DS DC X

Date: 29-03-2014
Time: 08:58
Age: 35

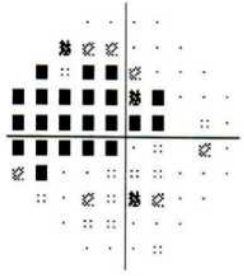
		26	22	25	25				
		18	21	21	26	28	30		
	12	27	11	22	26	27	30	31	
7	⟨0	2	⟨0	3	27	25	31	29	31
30	⟨0	0	⟨0	⟨0	29	26	26	21	27	28
	⟨0	3	⟨0	20	29	32	30	⟨0	26	29
	18	18	29	31	30	30	29	29	28	28
		23	28	28	29	27	27	28	29	
			26	26	27	28	28	29		
				28	28	26	24			



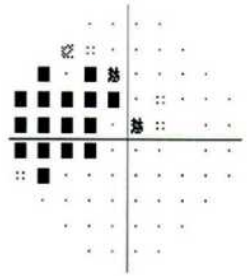
		-1	-5	-1	-1				
	-10	-8	-7	-3	0	2			
-17	-3	-20	-9	-5	-3	1	2		
-21	-32	-29	-34	-30	-5	-7	0	-1	1
-30	-31	-34	-35	-5	-7	-7		-4	-2
-30	-28	-34	-14	-5	-2	-3		-5	-2
-10	-13	-2	-2	-3	-3	-3	-3	-3	-3
	-6	-3	-4	-3	-5	-5	-3	-2	
		-3	-4	-4	-3	-3	-1		
			0	-1	-4	-6			

		2	-2	1	2				
	-8	-5	-5	0	3	5			
-15	-1	-17	-6	-2	-1	3	4		
-19	-29	-27	-32	-28	-2	-4	2	1	3
-28	-28	-32	-33	-3	-5	-4		-1	1
-28	-25	-32	-11	-2	1	0		-2	1
-7	-10	0	0	-1	-1	-1	0	0	0
	-4	0	-2	-1	-3	-2	0	0	
		-1	-2	-1	0	0	1		
			2	2	-1	-3			

Total Deviation



Pattern Deviation



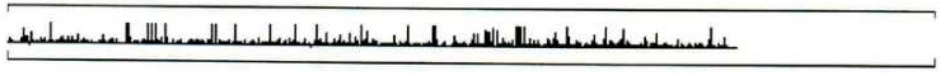
GHT
Outside Normal Limits

VFI 78%

MD -9.67 dB P < 0.5%
PSD 13.33 dB P < 0.5%

:: < 5%
⁘ < 2%
⁙ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 37010107469 | DOB: 01-01-1937

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 3/12
False POS Errors: 0%
False NEG Errors: 50%
Test Duration: 00:06:47

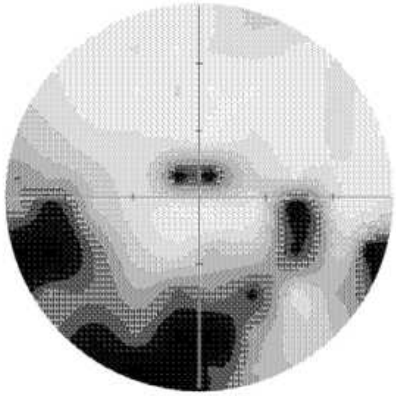
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: 3,25

Date: 01-09-2014
Time: 14:07:01
Age: 77

Fovea: -

			28	26	26	20			
			27	25	29	25	25	26	
		25	28	29	25	29	29	26	25
19	22	25	25	27	30	25	28	24	29
13	18	21	25	2	2	22	27	26	26
15	3	20	25	30	31	29	△	27	26
<0	<0	11	22	25	18	20	5	23	<0
	14	11	16	8	13	5	27	16	
		4	11	<0	<0	17	22		
			<0	0	9	17			



			0	-2	-2	-8			
		-1	-3	1	-3	-3	-2		
	-3	0	1	-3	1	1	-2	-3	
-9	-6	-3	-4	-4	-1	-4	0	-4	1
-15	-10	-7	-6	-31	-31	-9	-1	-2	-2
-13	-25	-8	-6	-3	-2	-2		-1	-2
-29	-29	-17	-7	-6	-13	-9	-23	-5	-29
	-14	-17	-12	-20	-15	-23	-1	-12	
		-24	-17	-29	-29	-11	-6		
			-29	-28	-19	-11			

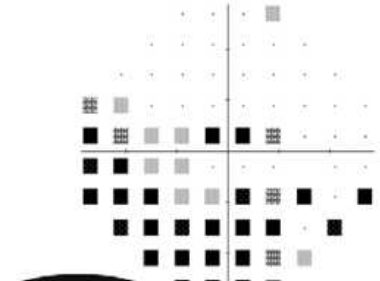
Total Deviation

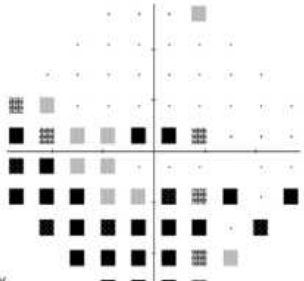
			0	-2	-2	-8			
		-1	-3	1	-3	-3	-2		
	-3	0	1	-3	1	1	-2	-3	
-9	-6	-3	-4	-4	-1	-4	0	-4	1
-15	-10	-7	-6	-31	-31	-9	-1	-2	-2
-13	-25	-8	-6	-3	-2	-2		-1	-2
-29	-29	-17	-7	-6	-13	-9	-23	-5	-29
	-14	-17	-12	-20	-15	-23	-1	-12	
		-24	-17	-29	-29	-11	-6		
			-29	-28	-19	-11			

Pattern Deviation

GHT
Hemifield depression

AP_MD: -11,19 dB
AP_PSD: 9,80 dB
AP_SF: -
AP_CPSD: -





P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Frey

Automated Perimeter AP ver. 8.0.0

Date of print: 07-12-2017

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1937.0101.2C02.1DAD.01EC.6D32 | DOB: 01-01-1937

Central 30-2 Threshold Test

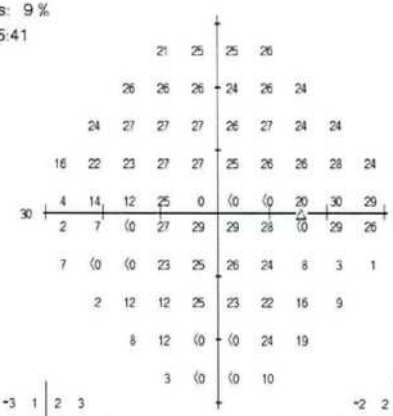
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 1/16
False POS Errors: 0 %
False NEG Errors: 9 %
Test Duration: 05:41

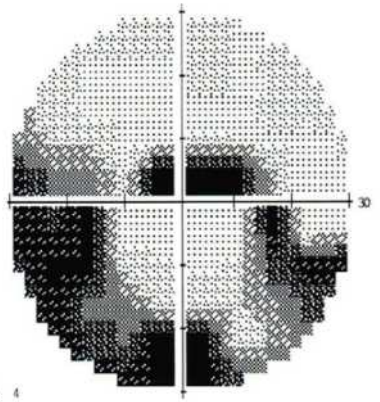
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Fast

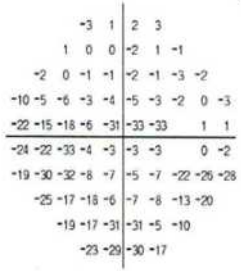
Pupil Diameter:
Visual Acuity:
RX: +3.25 DS DC X

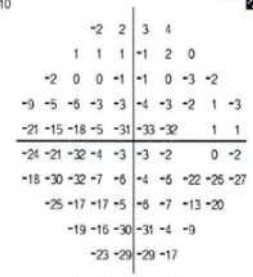
Date: 01-09-2014
Time: 13:27
Age: 77

Fovea: OFF









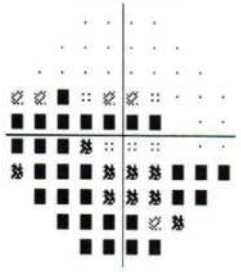
GHT
Outside Normal Limits

VFI 64%

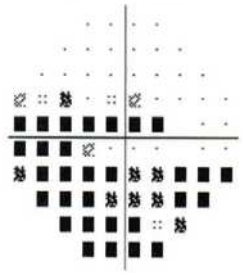
MD -11.54 dB P < 0.5%

PSD 12.80 dB P < 0.5%

Total Deviation

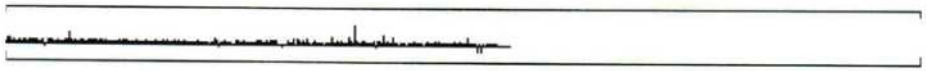


Pattern Deviation



:: < 5%
▒ < 2%
▓ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 29021603878 | DOB: 16-02-1929

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 8/16
False POS Errors: 0%
False NEG Errors: 15%
Test Duration: 00:07:12

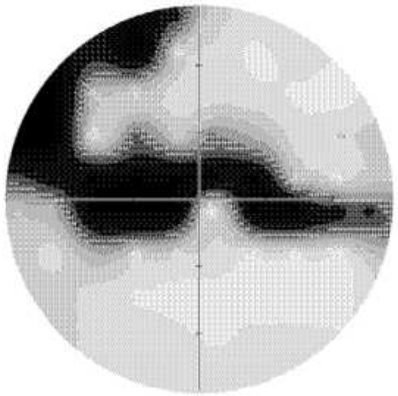
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: 5,25 DS -1,5 DC

Date: 01-03-2014
Time: 10:39:13
Age: 85

Fovea: -

		2	6	22	23				
		7	<0	24	23	27	24		
	<0	21	24	26	24	25	26	27	
<0	<0	26	9	22	12	17	25	22	21
9	3	<0	<0	<0	<0	<0	23	28	21
20	19	<0	<0	<0	29	<0	△	4	5
20	25	17	24	24	23	27	27	28	20
	20	25	26	27	28	27	28	26	
		23	23	24	26	24	24		
			23	24	23	25			



		-26	-22	-6	-5				
		-21	-29	-4	-5	-1	-4		
	-29	-7	-4	-2	-4	-3	-2	-1	
-29	-29	-2	-20	-9	-19	-12	-3	-6	-7
-19	-25	-29	-32	-34	-34	-32	-5	0	-7
-8	-9	-29	-32	-34	-4	-32		-24	-23
-8	-3	-11	-5	-7	-8	-2	-1	0	-8
	-8	-3	-2	-1	0	-1	0	-2	
		-5	-5	-4	-2	-4	-4		
			-5	-4	-5	-3			

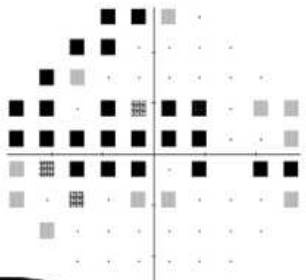
Total Deviation

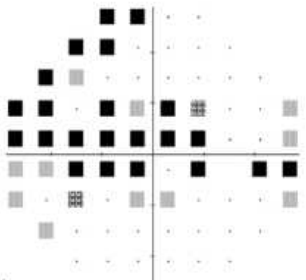
		-25	-21	-5	-4				
		-20	-28	-3	-4	0	-3		
	-28	-6	-3	-1	-3	-2	-1	0	
-28	-28	-1	-19	-8	-18	-11	-2	-5	-6
-18	-24	-28	-31	-33	-33	-31	-4	1	-6
-7	-8	-28	-31	-33	-3	-31		-23	-22
-7	-2	-10	-4	-6	-7	-1	0	1	-7
	-7	-2	-1	0	1	0	1	-1	
		-4	-4	-3	-1	-3	-3		
			-4	-3	-4	-2			

Pattern Deviation

GHT
Hemifield depression

AP_MD: -14,05 dB
AP_PSD: 11,17 dB
AP_SF: -
AP_CPSD: -





P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name: | DOB: 16-02-1929

ID: 1929.0216.81FD.C0D6.BDD2.89D7

Central 30-2 Threshold Test

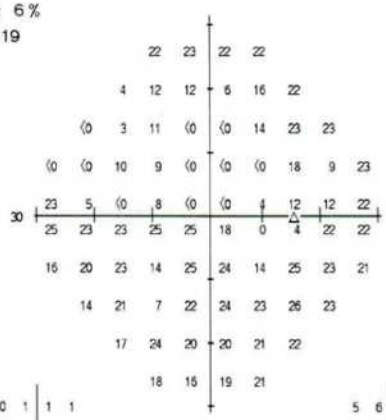
Fixation Monitor: Blind Spot
Fixation Target: Central
Fixation Losses: 21/23 xx
False POS Errors: 6 %
False NEG Errors: 6 %
Test Duration: 12:19

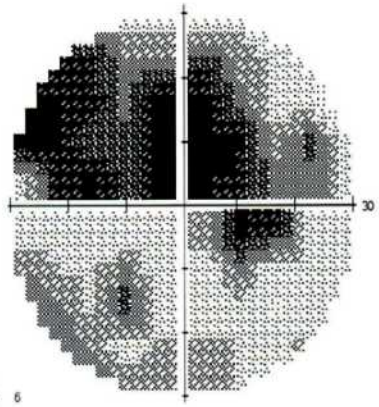
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: +5.25 DS -1.50 DC X 58

Date: 01-03-2014
Time: 10:02
Age: 85

Fovea: OFF





		0	1	1	1				
		-20	-13	-13	-19	-8	-1		
	-27	-24	-16	-30	-29	-13	-3	-2	
-26	-29	-19	-20	-32	-31	-31	-10	-17	-3
-2	-23	-32	-23	-33	-32	-26		-16	-5
0	-5	-7	-6	-6	-13	-30		-6	-5
-8	-8	-7	-17	-6	-7	-16	-5	-5	-7
	-12	-7	-22	-8	-5	-7	-3	-5	
		-9	-3	-8	-9	-7	-6		
			-7	-10	-7	-6			

		5	6	6	6				
		-15	-7	-8	-14	-3	4		
	-22	-19	-11	-25	-24	-8	2	3	
-21	-24	-13	-15	-27	-26	-26	-5	-12	2
3	-18	-27	-18	-28	-27	-21		-11	0
5	0	-2	-1	-1	-8	-25		-1	0
-3	-3	-1	-12	-1	-2	-11	1	0	-1
	-7	-2	-17	-3	-1	-2	2	0	
		-4	2	-3	-3	-2	-1		
			-2	-5	-2	-1			

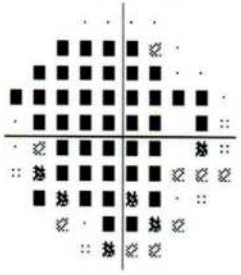
*** Low Test Reliability ***

GHT
Outside Normal Limits

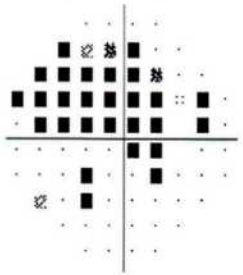
VFI 52%

MD -14.40 dB P < 0.5%
PSD 11.92 dB P < 0.5%

Total Deviation



Pattern Deviation



:: < 5%
⁘ < 2%
⁙ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25

HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 54070916613 | DOB: 09-07-1954

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 1/17
False POS Errors: 0%
False NEG Errors: 40%
Test Duration: 00:06:21

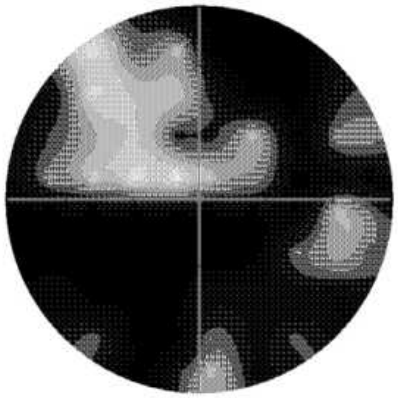
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: 2,25

Date: 14-07-2014
Time: 10:18:14
Age: 60

Fovea: -

			5	1	<0	<0			
		25	9	20	<0	<0	<0		
	4	24	19	19	5	<0	<0	7	
2	8	16	20	5	6	19	<0	14	12
2	15	22	27	29	20	13	<0	<0	<0
<0	<0	<0	<0	<0	<0	<0	△	20	10
<0	<0	<0	<0	<0	<0	<0	11	16	8
	1	<0	<0	<0	4	3	2	0	
		10	<0	<0	11	3	9		
			<0	7	19	3			



Total Deviation

			-24	-28	-30	-30			
		-4	-20	-9	-30	-30	-30		
	-25	-5	-10	-10	-24	-30	-30	-22	
-27	-21	-13	-10	-27	-26	-11	-30	-15	-17
-27	-14	-7	-5	-5	-14	-19	-30	-30	-30
-30	-30	-30	-33	-35	-35	-33		-9	-19
-30	-30	-30	-31	-33	-33	-31	-18	-13	-21
	-28	-30	-30	-30	-25	-26	-27	-29	
		-19	-30	-30	-18	-26	-20		
			-30	-22	-10	-26			

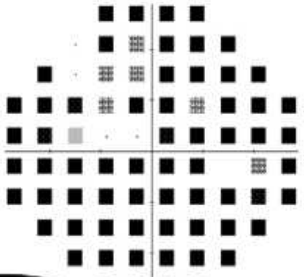
Pattern Deviation

			-15	-19	-21	-21			
		5	-11	0	-21	-21	-21		
	-16	4	-1	-1	-15	-21	-21	-13	
-18	-12	-4	-1	-18	-17	-2	-21	-6	-8
-18	-5	2	4	4	-5	-10	-21	-21	-21
-21	-21	-21	-24	-26	-26	-24		0	-10
-21	-21	-21	-22	-24	-24	-22	-9	-4	-12
	-19	-21	-21	-21	-16	-17	-18	-20	
		-10	-21	-21	-9	-17	-11		
			-21	-13	-1	-17			

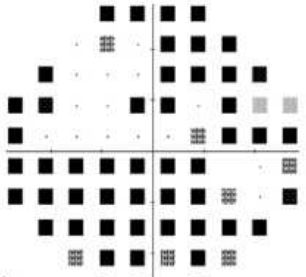
GHT
Hemifield depression

AP_MD: -30,44 dB
AP_PSD: 8,64 dB
AP_SF: -
AP_CPSD: -

Total Deviation



Pattern Deviation



P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name: | DOB: 09-07-1954

ID: 1954.0709.FC2C.C311.AFC8.2AAC

Central 30-2 Threshold Test

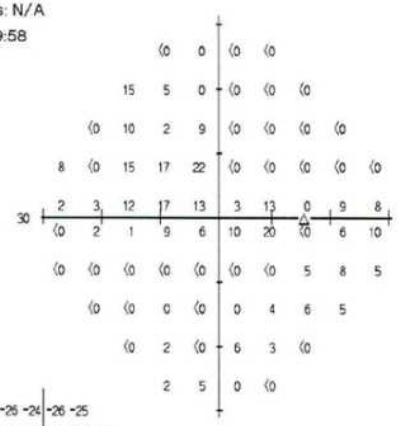
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 0/19
False POS Errors: 0 %
False NEG Errors: N/A
Test Duration: 09:58

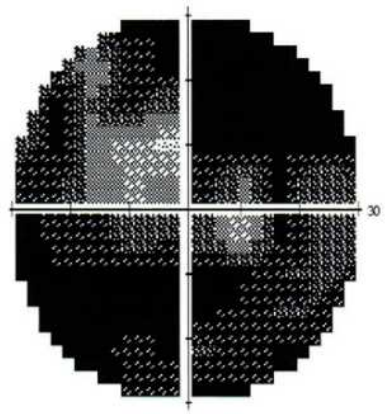
Fovea: OFF

Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: +2.25 DS DC X

Date: 14-07-2014
Time: 11:20
Age: 60





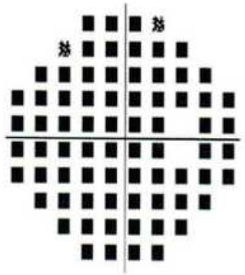
Pattern Deviation not shown for severely depressed fields. Refer to Total Deviation.

GHT
Outside Normal Limits

VFI 19%

MD -25.85 dB P < 0.5%
PSD 7.48 dB P < 0.5%

Total Deviation



Pattern Deviation

Pattern Deviation not shown for severely depressed fields. Refer to Total Deviation.

:: < 5%
▨ < 2%
▩ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25

HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: 35060102557 | DOB: 01-06-1935

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 6/23
False POS Errors: 0%
False NEG Errors: 21%
Test Duration: 00:07:32

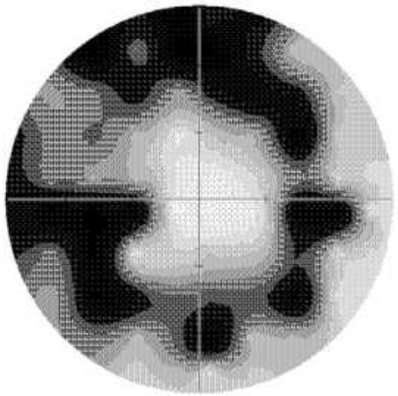
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: 5,25 DS

Date: 08-02-2014
Time: 09:29:52
Age: 78

Fovea: -

			5	<0	7	3			
		<0	11	<0	<0	7	20		
	15	12	4	16	5	1	4	20	
6	12	9	18	28	20	17	<0	22	21
6	14	17	19	27	30	23	13	24	24
3	<0	<0	<0	33	32	30	△	<0	26
7	13	<0	27	22	19	19	7	24	23
	16	<0	3	10	8	8	<0	26	
		12	19	9	<0	20	18		
			22	18	24	20			



			-23	-29	-21	-25			
		-29	-17	-29	-29	-21	-8		
	-13	-16	-24	-12	-23	-27	-24	-8	
-22	-16	-19	-11	-3	-11	-12	-29	-6	-7
-22	-14	-11	-12	-6	-3	-8	-15	-4	-4
-25	-29	-29	-32	0	-1	-1		-29	-2
-21	-15	-29	-2	-9	-12	-10	-21	-4	-5
	-12	-29	-25	-18	-20	-20	-29	-2	
		-16	-9	-19	-29	-8	-10		
			-6	-10	-4	-8			

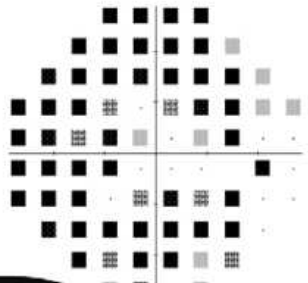
Total Deviation

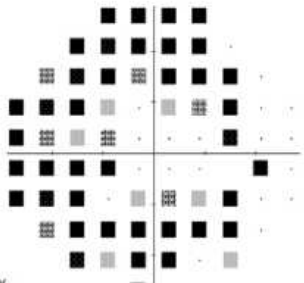
			-20	-26	-18	-22			
		-26	-14	-26	-26	-18	-5		
	-10	-13	-21	-9	-20	-24	-21	-5	
-19	-13	-16	-8	0	-8	-9	-26	-3	-4
-19	-11	-8	-9	-3	0	-5	-12	-1	-1
-22	-26	-26	-29	3	2	2		-26	1
-18	-12	-26	1	-6	-9	-7	-18	-1	-2
	-9	-26	-22	-15	-17	-17	-26	1	
		-13	-6	-16	-26	-5	-7		
			-3	-7	-1	-5			

Pattern Deviation

GHT
Zone defect

AP_MD: -18,76 dB
AP_PSD: 9,36 dB
AP_SF: -
AP_CPSD: -





P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Date of print: 07-12-2017

Frey

Automated Perimeter AP ver. 8.0.0

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1935.0601.F8BC.16AB.1F64.E772
DOB: 01-06-1935

Central 30-2 Threshold Test

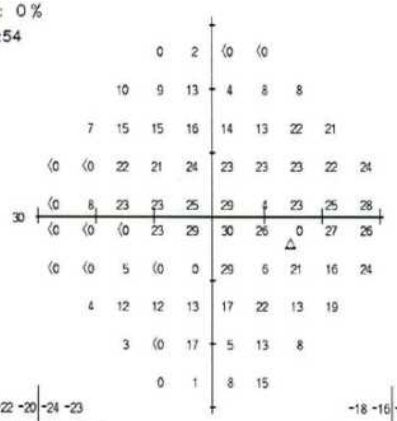
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 0/22
False POS Errors: 0 %
False NEG Errors: 0 %
Test Duration: 09:54

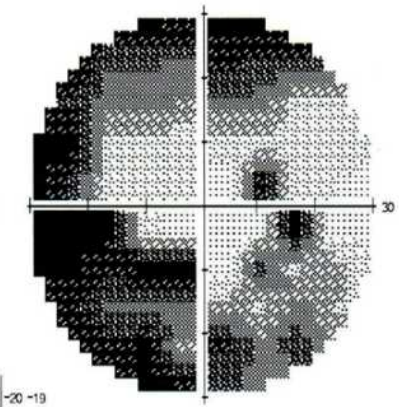
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: +5.25 DS DC X

Date: 08-02-2014
Time: 08:35
Age: 78

Fovea: OFF





			-22	-20	-24	-23			
		-15	-16	-13	-21	-17	-16		
	-18	-12	-13	-12	-14	-14	-4	-5	
-26	-29	-7	-9	-6	-7	-6	-6	-5	-2
-27	-20	-7	-8	-6	-2	-26		-3	1
-27	-30	-32	-8	-3	-1	-4		-2	-1
-27	-30	-25	-33	-31	-2	-25	-9	-12	-4
-22	-17	-18	-17		-13	-8	-16	-10	
	-24	-30	-12		-24	-15	-20		
		-26	-26		-19	-12			

Total Deviation

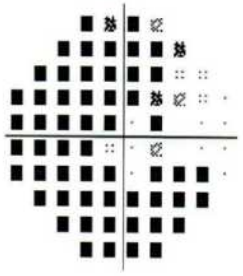
			-18	-16	-20	-19			
		-10	-12	-8	-17	-13	-12		
	-14	-8	-9	-7	-10	-10	0	0	
-22	-25	-3	-5	-2	-2	-2	-1	-1	3
-23	-15	-3	-3	-2	3	-21		1	5
-23	-26	-28	-4	2	3	0		3	3
-22	-25	-20	-28	-27	2	-20	-5	-8	1
	-17	-12	-14	-12	-9	-4	-12	-5	
		-19	-26	-7	-20	-11	-16		
			-21	-21	-15	-8			

Pattern Deviation

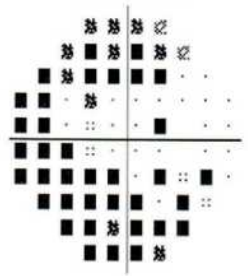
GHT
Outside Normal Limits

VFI 67%

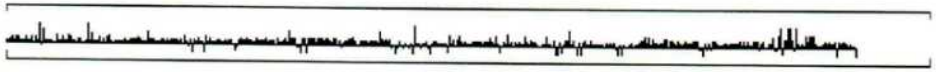
MD -14.29 dB P < 0.5%
PSD 11.42 dB P < 0.5%



:: < 5%
▨ < 2%
▩ < 1%
■ < 0.5%



SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

Single Field Analysis | Eye: Right

Name: | ID: | DOB: 21-02-1954

Test name: Central 30-2

Fixation Target: Central
Fixation Monitor: Blindspot
Fixation Losses: 4/23
False POS Errors: 0%
False NEG Errors: 9%
Test Duration: 00:07:15

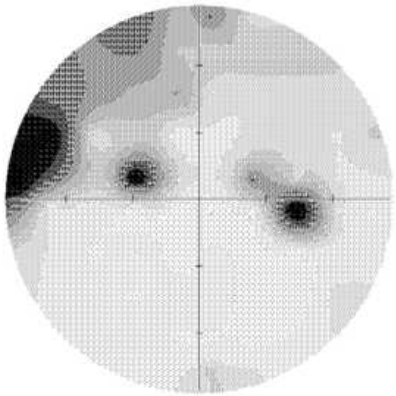
Stimulus: White III
Background: White 10 cd/m2
Strategy: Fast Threshold

Pupil Diameter: -
Visual Acuity:
RX: 3,75

Date: 21-07-2014
Time: 11:03:36
Age: 60

Fovea: -

			11	19	13	24			
		14	13	20	21	20	21		
	12	14	18	16	26	25	24	23	
5	3	26	21	29	27	25	24	26	22
<0	10	21	<0	22	26	12	24	26	26
13	29	28	31	30	32	30	△	26	29
24	26	29	25	31	27	30	30	28	27
	26	28	29	27	27	30	30	23	
		26	26	29	29	29	28		
			27	26	21	25			



		-18	-10	-16	-5				
	-15	-16	-9	-8	-9	-8			
-17	-15	-11	-13	-3	-4	-5	-6		
-24	-26	-3	-9	-3	-5	-5	-5	-3	-7
-30	-19	-8	-33	-12	-8	-20	-5	-3	-3
-16	0	-1	-1	-4	-2	-2		-3	0
-5	-3	0	-5	-1	-5	0	1	-1	-2
	-3	-1	0	-2	-2	1	1	-6	
		-3	-3	0	0	0	-1		
			-2	-3	-8	-4			

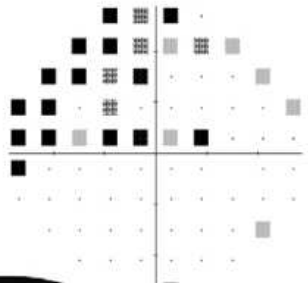
Total Deviation

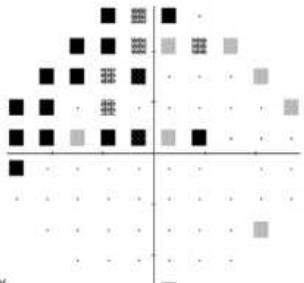
		-18	-10	-16	-5				
	-15	-16	-9	-8	-9	-8			
-17	-15	-11	-13	-3	-4	-5	-6		
-24	-26	-3	-9	-3	-5	-5	-5	-3	-7
-30	-19	-8	-33	-12	-8	-20	-5	-3	-3
-16	0	-1	-1	-4	-2	-2		-3	0
-5	-3	0	-5	-1	-5	0	1	-1	-2
	-3	-1	0	-2	-2	1	1	-6	
		-3	-3	0	0	0	-1		
			-2	-3	-8	-4			

Pattern Deviation

GHT
Hemifield depression

AP_MD: -7,17 dB
AP_PSD: 7,41 dB
AP_SF: -
AP_CPSD: -





P < 5%
P < 2.5%
P < 0.5%
P < 0.1%

Frey

Automated Perimeter AP ver. 8.0.0

Date of print: 07-12-2017

Doctor: SYSTEM ADMINISTRATOR, User: SYSTEM ADMINISTRATOR

Single Field Analysis | Eye: Right

Name:
ID: 1954.0221.1316.578A.1203.C553
DOB: 21-02-1954

Central 30-2 Threshold Test

Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 3/20
False POS Errors: 0 %
False NEG Errors: 11 %
Test Duration: 08:05

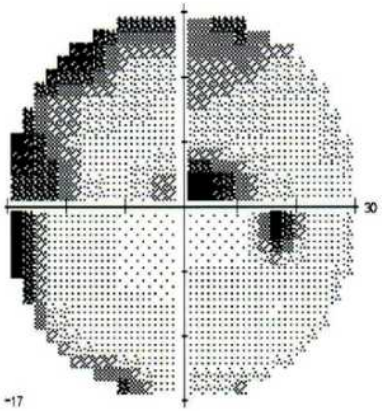
Fovea: OFF

Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter:
Visual Acuity:
RX: +3.75 DS DC X

Date: 21-07-2014
Time: 09:36
Age: 60

				8	10	12	6		
			5	20	23	17	15	23	
		15	22	25	26	20	25	26	26
	0	15	26	27	28	25	26	27	26	22
30	7	6	25	27	17	0	15	25	27	26	30
	0	26	28	31	32	32	32	0	28	24	
	0	30	30	31	32	30	30	29	27	23	
		23	30	29	30	29	29	31	27		
			25	29	29	27	28	27			
				8	26	23	20				



		-16	-14	-11	-17				
	-22	-7	-4	-10	-11	-2			
-11	-6	-4	-3	-9	-3	-2	-1		
-26	-13	-4	-4	-3	-6	-4	-2	-2	-6
-20	-24	-6	-5	-15	-32	-17		-2	-2
-29	-3	-3	-1	-1	0	0		-2	-4
-28	1	-1	-1	0	-2	-1	-1	-2	-6
	-5	0	-1	-1	-2	-2	1	-3	
		-3	1	-1	-2	-2	-3		
			-19	-2	-5	-9			

Total Deviation

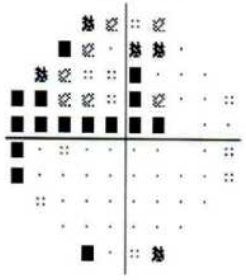
		-16	-14	-11	-17				
	-22	-7	-4	-9	-11	-2			
-11	-6	-4	-3	-9	-3	-2	-1		
-26	-13	-4	-4	-3	-6	-4	-2	-2	-6
-20	-24	-6	-5	-15	-32	-17		-2	-2
-29	-3	-3	-1	-1	0	0		-2	-4
-28	1	-1	-1	0	-2	-1	-1	-2	-6
	-5	0	-1	-1	-2	-2	1	-3	
		-3	1	0	-2	-2	-3		
			-19	-2	-5	-9			

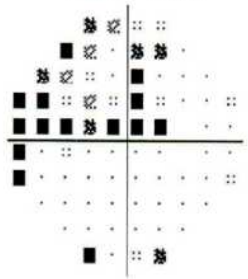
Pattern Deviation

GHT
Outside Normal Limits

VFI 81%

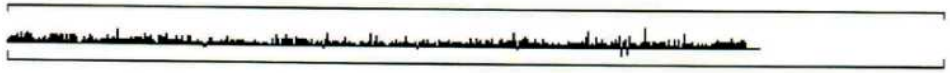
MD -5.23 dB P < 0.5%
PSD 8.40 dB P < 0.5%





:: < 5%
▨ < 2%
▩ < 1%
■ < 0.5%

SPEKTRUM Sp. z o.o.
UL. ZAOLZIANSKA 4
53-334 WROCLAW
TEL: 71 344 57 25



HFA II 740-32069-5.1.1/5.1.1

LEARN MORE ABOUT OUR DEVICES

AP-300

AP-300 is a modern and innovative Automated Perimeter that meets global standards for excellence around visual sensitivity testing, diagnosis and management of eye disease. AP-300 platform of advanced diagnostics uses Kinetic and Static Perimetry, including white/white perimetry, blue/yellow (SWAP - Short wavelength automated perimetry) and Flicker (critical flicker fusion perimetry) for early glaucoma detection plus real Goldmann Kinetic Perimetry.

AP-300 comes standard with an extensive range of strategies, fields and test parameters. Built-in camera complemented by automated eye tacking provides reliable automated fixation control. Standard built-in data capture and analysis include regression analysis of the visual field on the basis of historical examinations and standardized fields for presentation and printing of examination results. Easy to navigate, intuitive software allows easy operation and is designed to be operated using the touch screen. AP-300 design includes built-in high quality PC computer.

AP-250/250BY

AP-250 and AP-250BY are fully functional static back LED projection automated perimeters with a full field measurement. AP-250 and AP-250BY use green color LED projection of stimulus in Goldman size III. AP-250BY additionally offers test Blue-on-yellow with a blue stimulus Goldman V size and yellow backlight in accordance with the requirements of the SWAP perimetry.

The intuitive software platform provides operators with a wide range of strategies, fields and test parameters. Control of fixation is performed automatically using the built-in camera or by controlling the position of the blind spot. Built-in data capture and analysis include regression analysis and standardized fields for presentation and printing of examination results. Perimeter AP-250 and AP-250BY can be easily set up with any PC computer running the Windows operating system.

AP-50

AP-50 is a desktop model, lightweight and fully featured modern static automated perimeter ideal for glaucoma diagnosis and specific requirements of occupational medicine and busy mobile clinicians. AP-50 uses LED back projection of stimulus in white color, and offers a wide range of strategies, test fields and reach set of test parameters to assure quick and precise measurement. Control of fixation is performed automatically using the built-in camera or by controlling the position of the blind spot. Built-in data analysis includes regression analysis and standardized ways of presenting and printing examination results. Perimeter AP-50 can work with any PC computer running the Windows operating system.

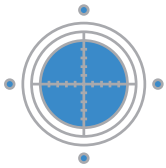
KNOW BENEFITS

Frey Perimeter

Frey Perimeter product range covers entire spectrum of visual field test technologies, from complete testing and data analyzing system AP-300 to small size and lightweight glaucoma screening AP-50 device. Frey perimeter software is feature rich and designed to be intuitive and easy to use.

Rapid testing times

Several techniques are available to reduce examination time, including Screening and Fast Threshold strategies, and enhanced fixation methods. For patients with large field losses, the use of pattern calibration and neurological test methods is available.



Accurate results

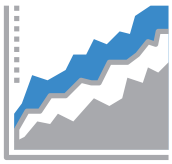
The high density concentric points stimulator bowl and the enhanced stimulus control combined with the automatic eye tracking fixation method, provide accurate examination of field loss.

User friendly software

Frey Perimeter software was designed to be intuitive and simple to use, even for operators with limited computer skills. The interactive menus provide comprehensive information and efficient operation, reducing the time spent preparing, reviewing and printing patient exams. The software is designed to be easily operated with a touch screen.

Improved patient comfort

Patient comfort can influence the reliability of the exams. The design of the stimulator unit augments ventilation, chinrest assures stable and comfortable patient head support during entire examination.



Complete analysis modes

- World population statistics.
- Enhanced 3D function for all shaded maps.
- Age-normal, HoV, Level, ABS and normalized display.
- Differential map.
- Standard automated perimetry analysis.

Multiple test capabilities

Frey Perimeters have a wide range of tests available to suit every need - Glaucoma, Full Field, Peripheral, Macula, Wide Field, Flicker, Binocular Single Vision, Driving Test and others.

Networking

Frey Perimeter software is designed to seamlessly integrate with computer networks. Multiple perimeters may share one examination database. For result printing and centralized data storage network printers and network data servers can be used. Automated backup function assures safety of patient data. Service access and Wi-Fi connectivity any time anywhere for Frey technical support.

FREY Spółka Jawna
Wołodyjowskiego 38
05-502 PIASECZNO
POLAND