Kursus for øjenlægepersonale , Kolding 30.-31.jan. 2015
Danske Øjenlægers Organisation

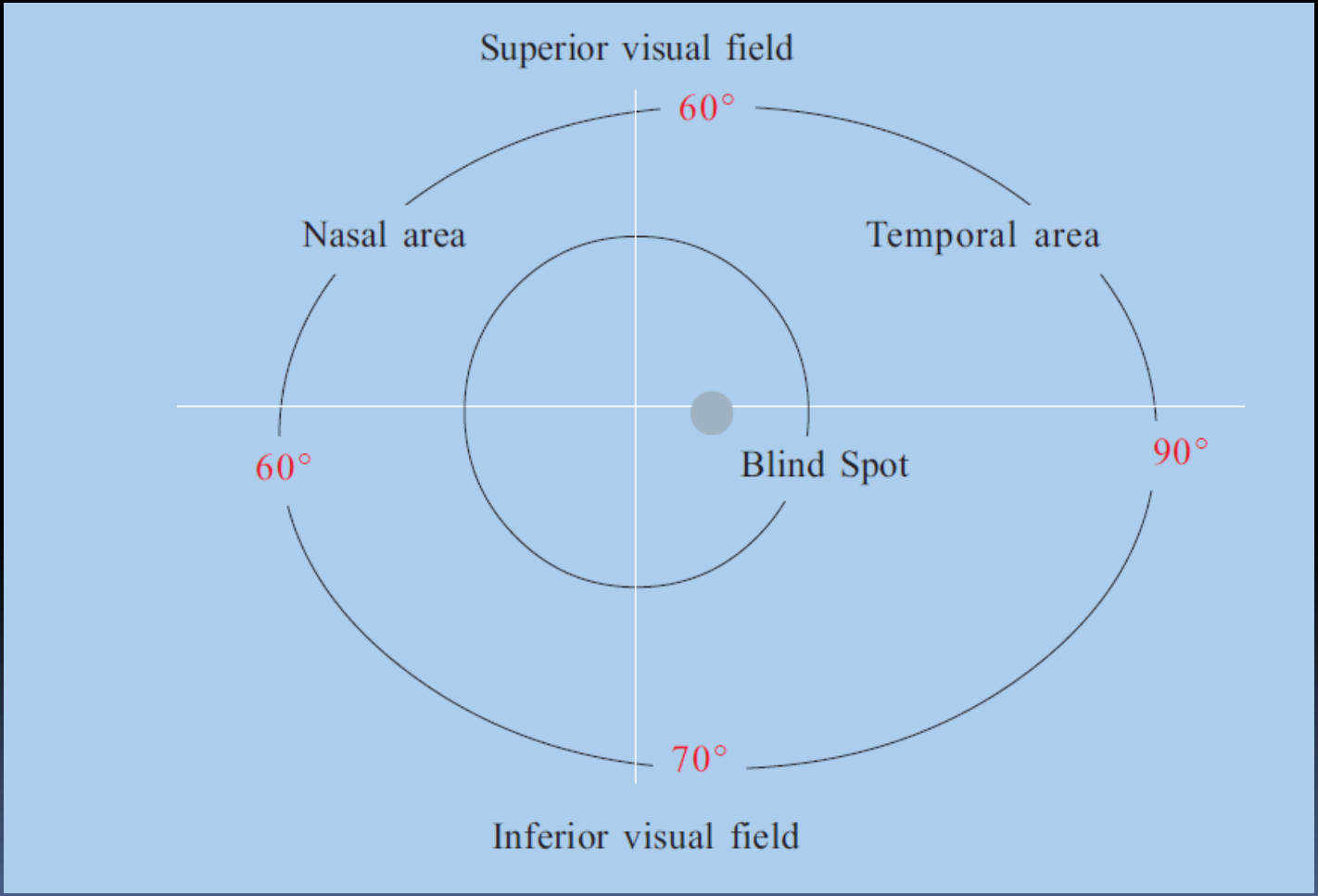
PERIMETRI
UDFØRELSE OG TOLKNING

Karen Bjerg Pedersen, afd.læge, PhD, FEBO. Øjenafdelingen Glostrup Hospital

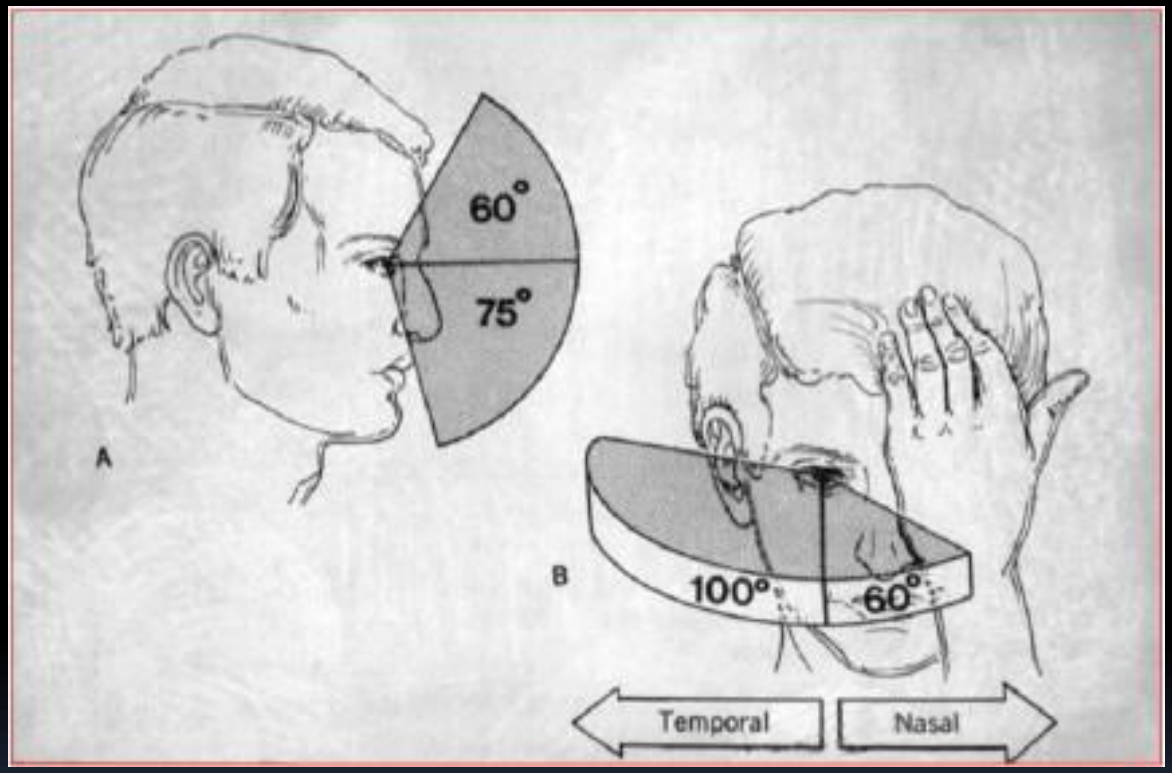
Hvad er Automatiseret Statisk Perimetri?

- En måde at teste patientens synsfelt
- Kvantificere sensitiviteten af en patients perifere syn
- Essentiel i glaukom diagnosticering og opfølgning
- Standardiserede test algoritmer
- Gentagne perimetrier er stadig den mest præcise metode til at kvantificere glaukom progression

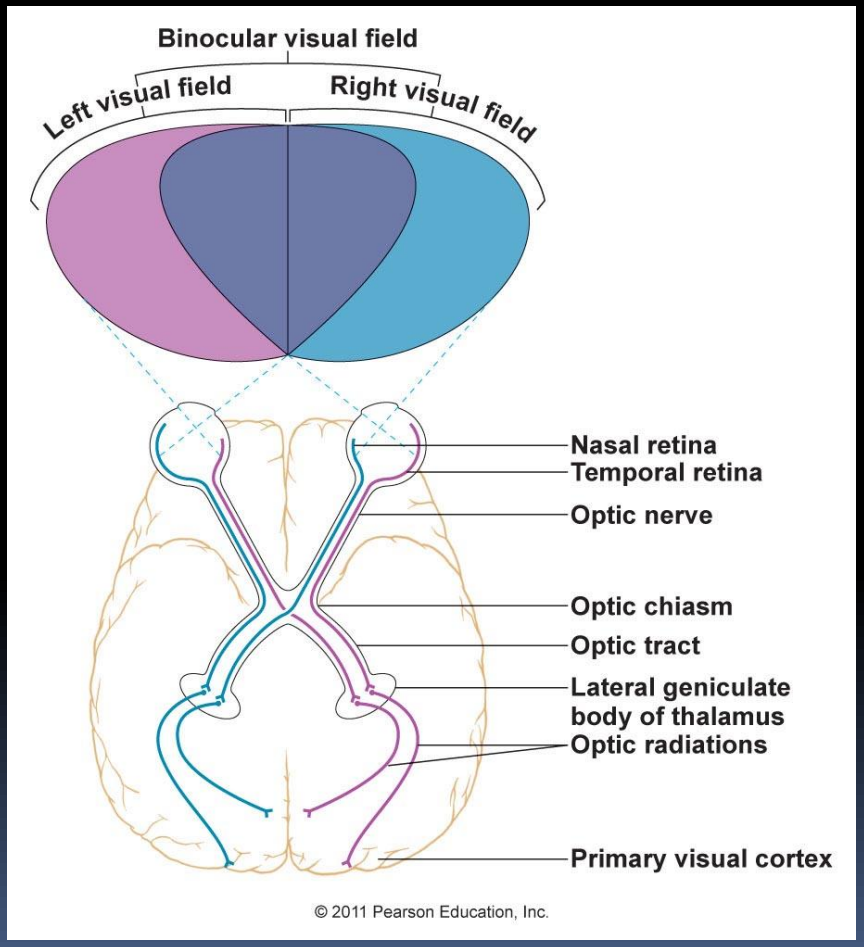
Det normale synsfelt, højre øje

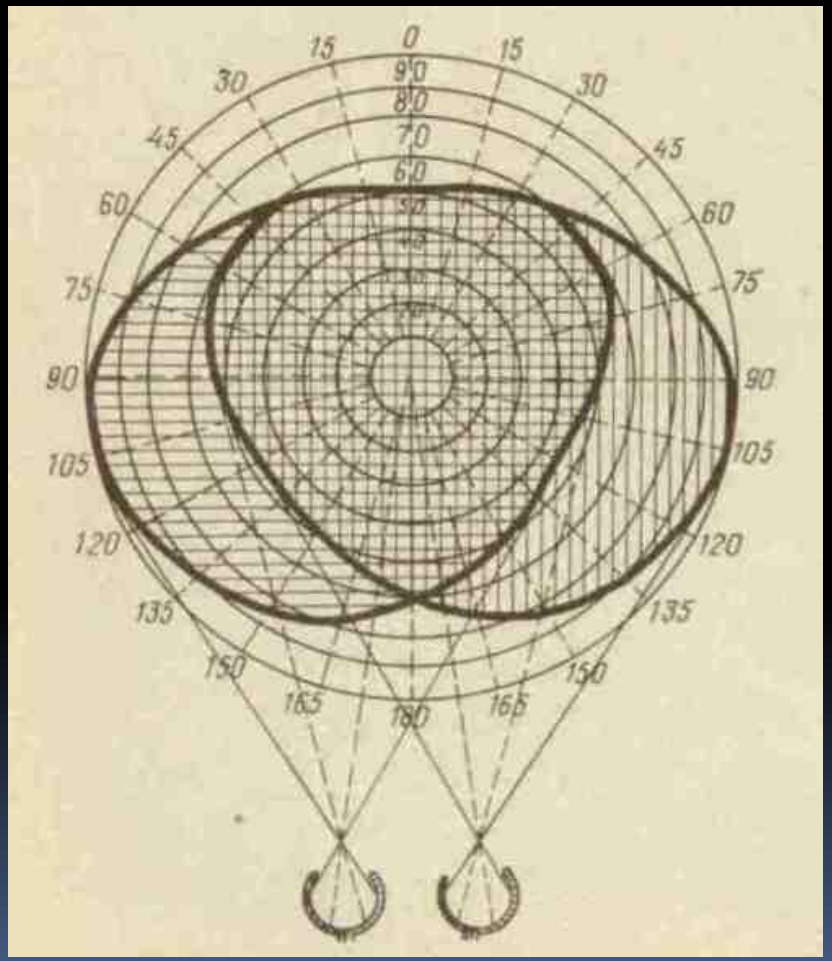


Det normale synsfelt højre øje



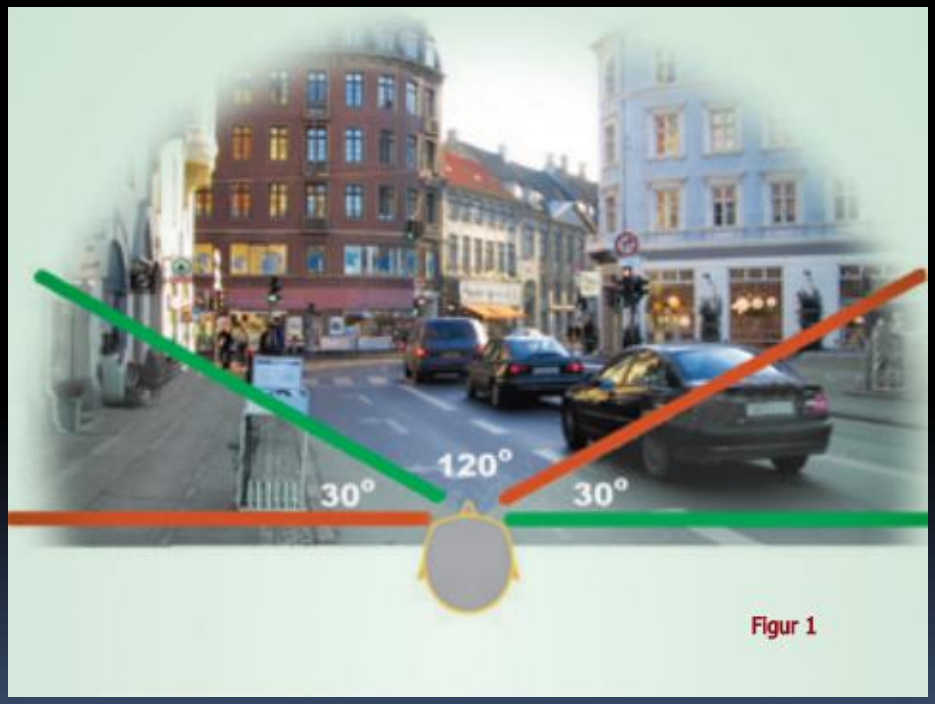
Det normale binokulære synsfelt





Det normale binokulære synsfelt

Vandret



Lodret

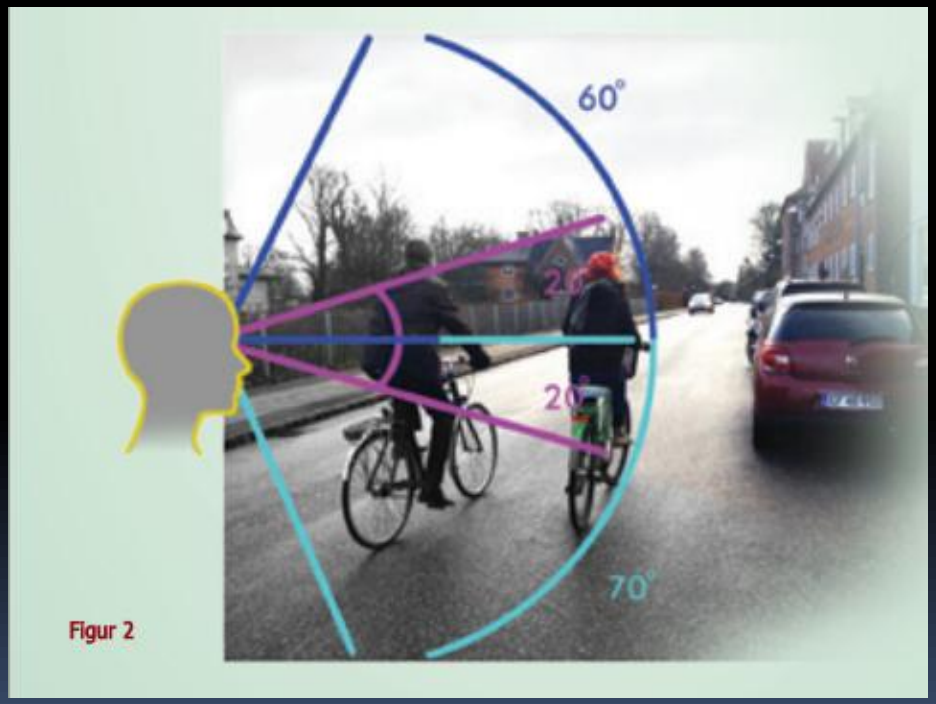
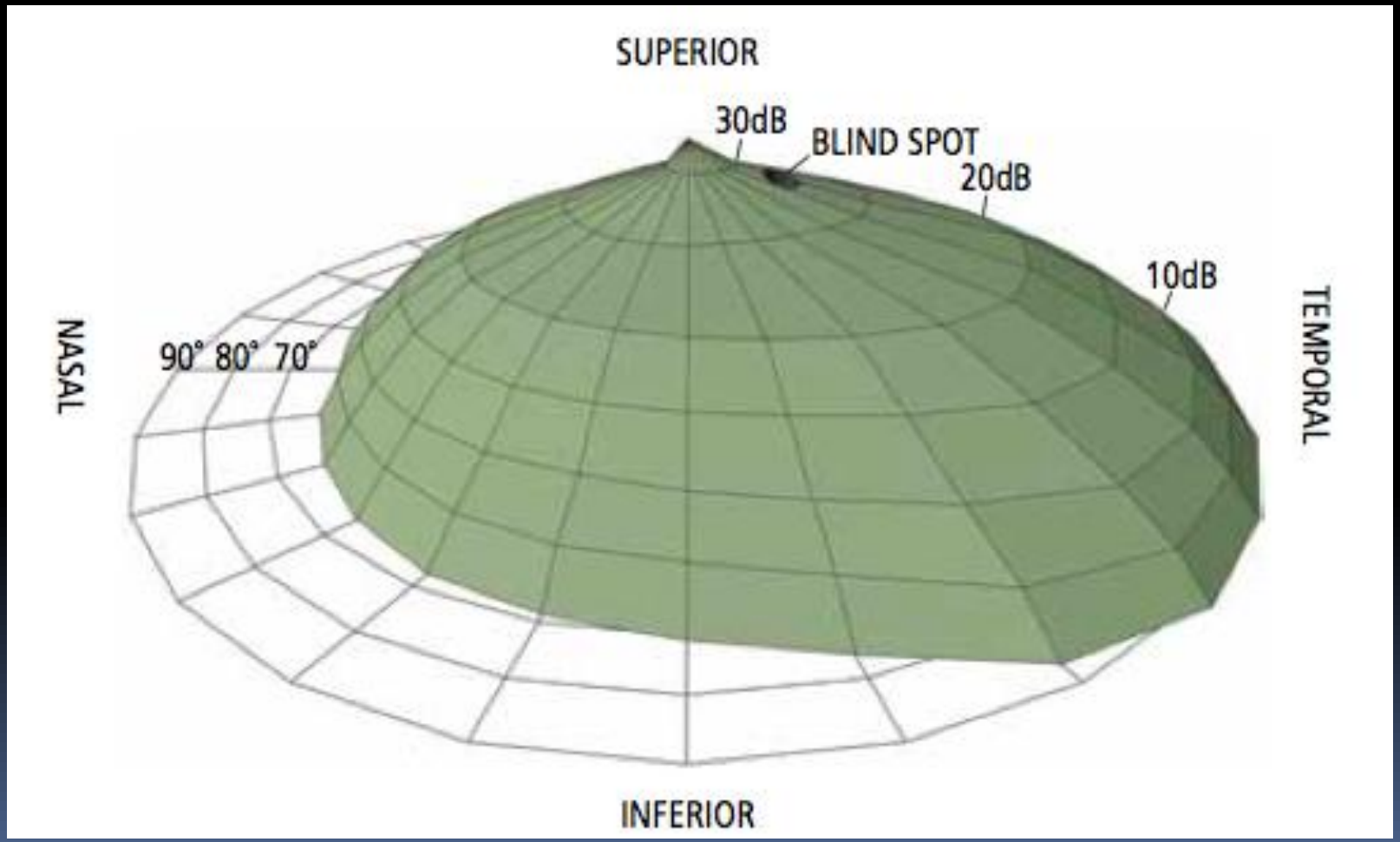
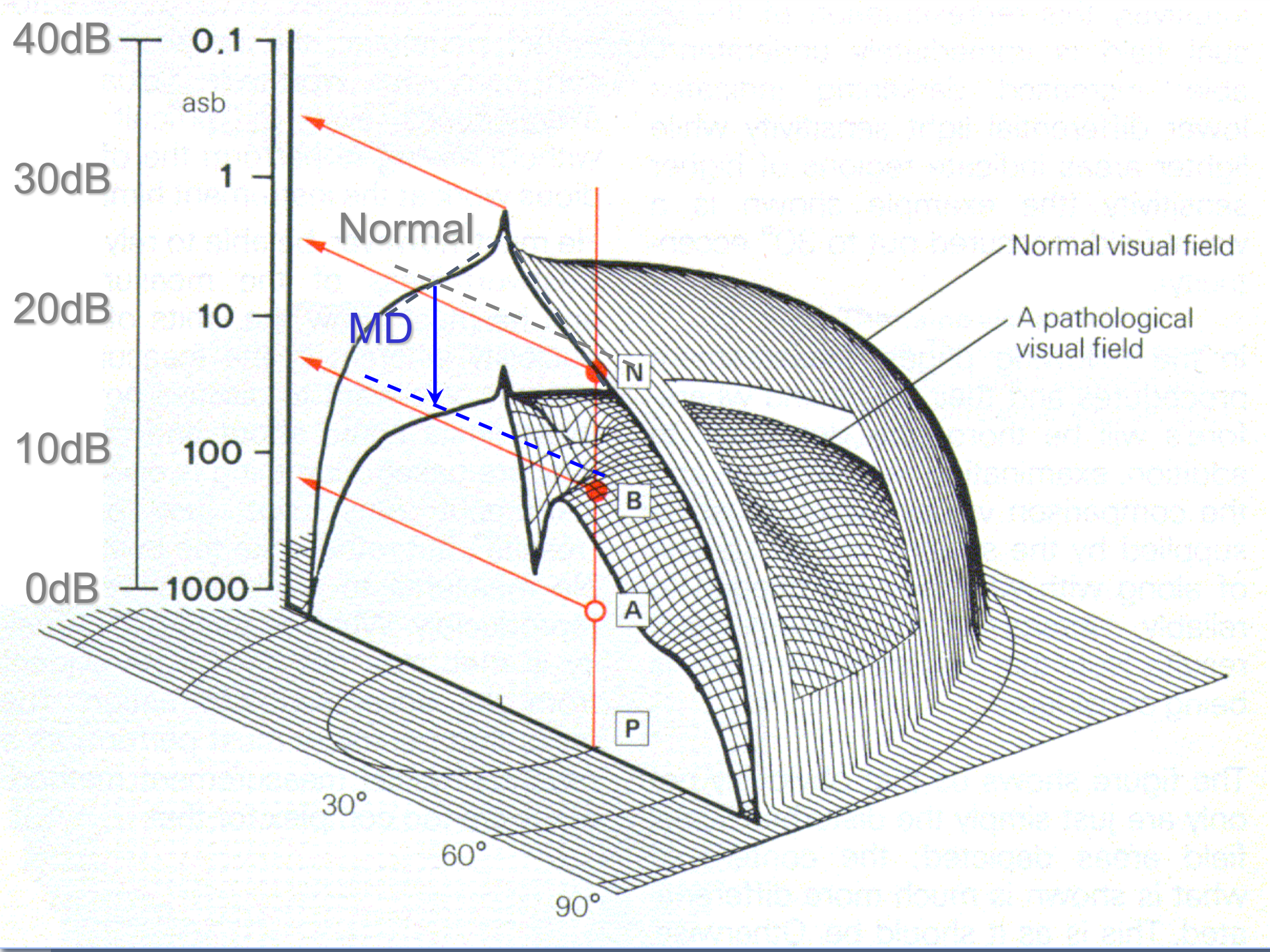


Image courtesy Værn om Synet

”Hill of vision” – normalt synsfelt højre øje




40dB
30dB
20dB
10dB
0dB
0.1
asb
1
10
100
1000
Normal
MD
N
B
A
P
30°
60°
90°
Normal visual field
A pathological visual field

Perimetri typer: Goldmann kinetisk perimetri

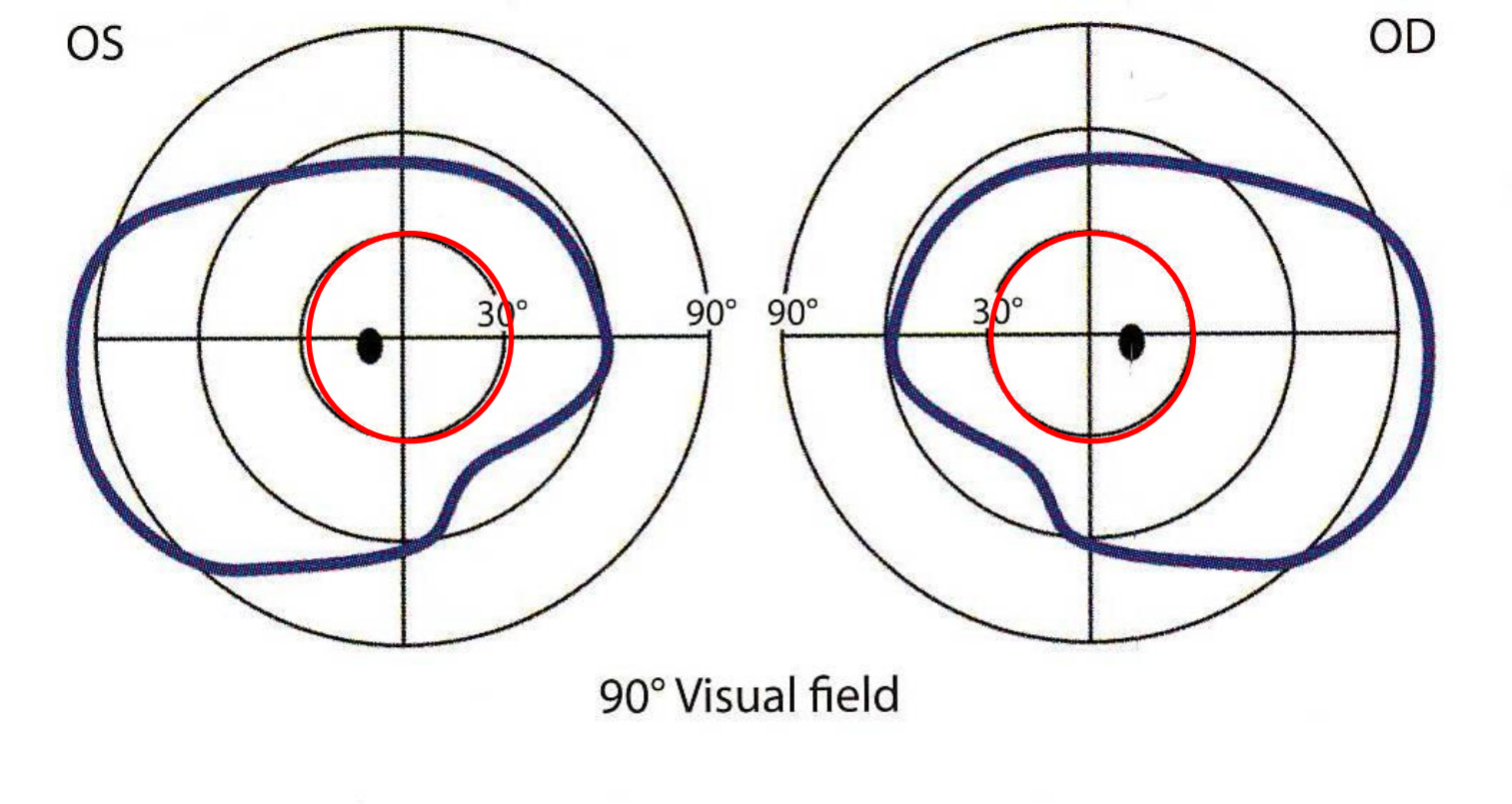
Image courtesy John Thygesen

Perimetri typer: automatiseret

OCTOPUS

HUMPHREY

Autoperimetri

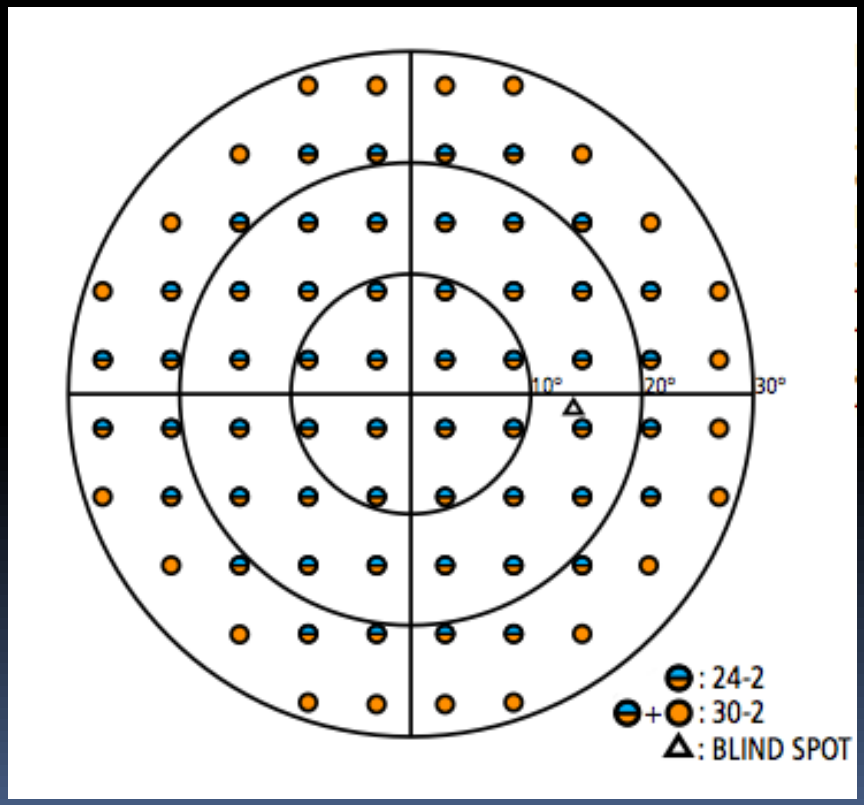


Valg af program

- Octopus dG 30 deg. Glaucoma, Neurology
- Octopus Macula
- Humphrey: Neurology 30-2 / Glaucoma 30-2
- Humphrey: Glaucoma 24-2 SITA
- Octopus Top: Glaucoma for Children and Elderly
- Octopus dG 30 deg: Glaucoma with 2 phases
- Octopus 07: Neurology with Periphery

Valg af program

24-2 vs 30-2



10-2 versus 24-2

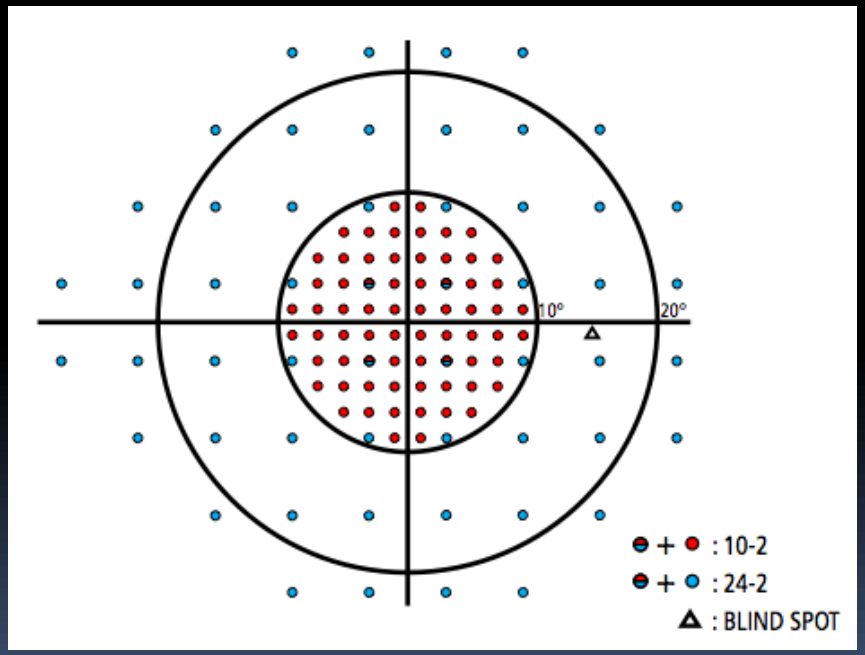
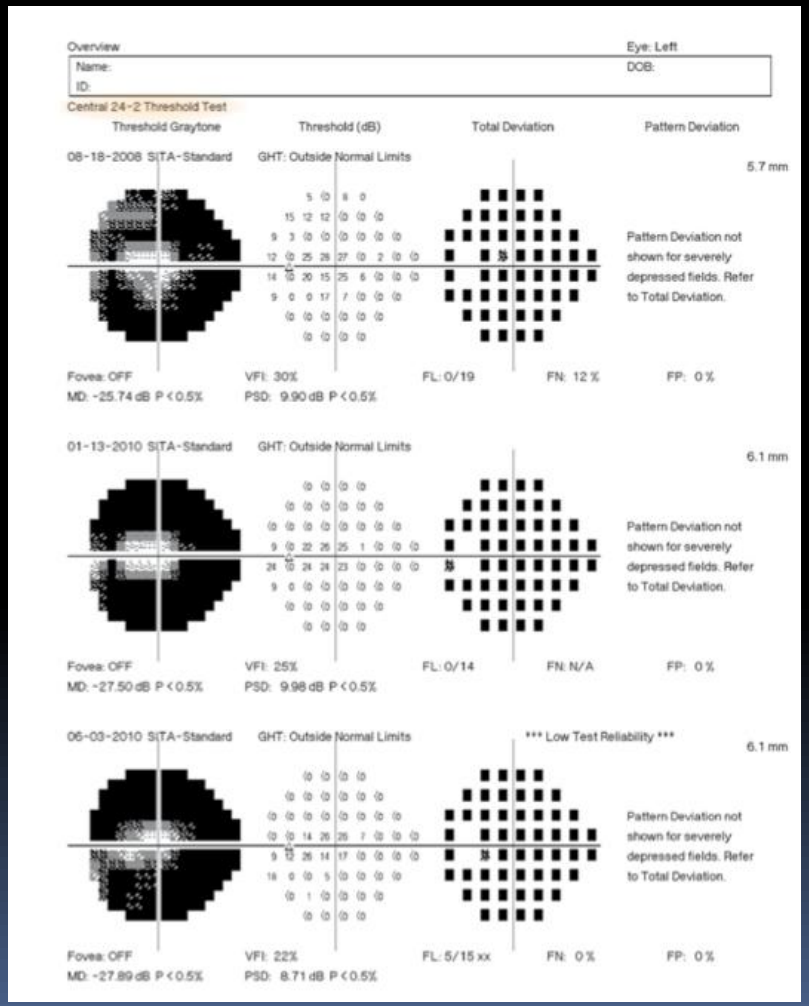
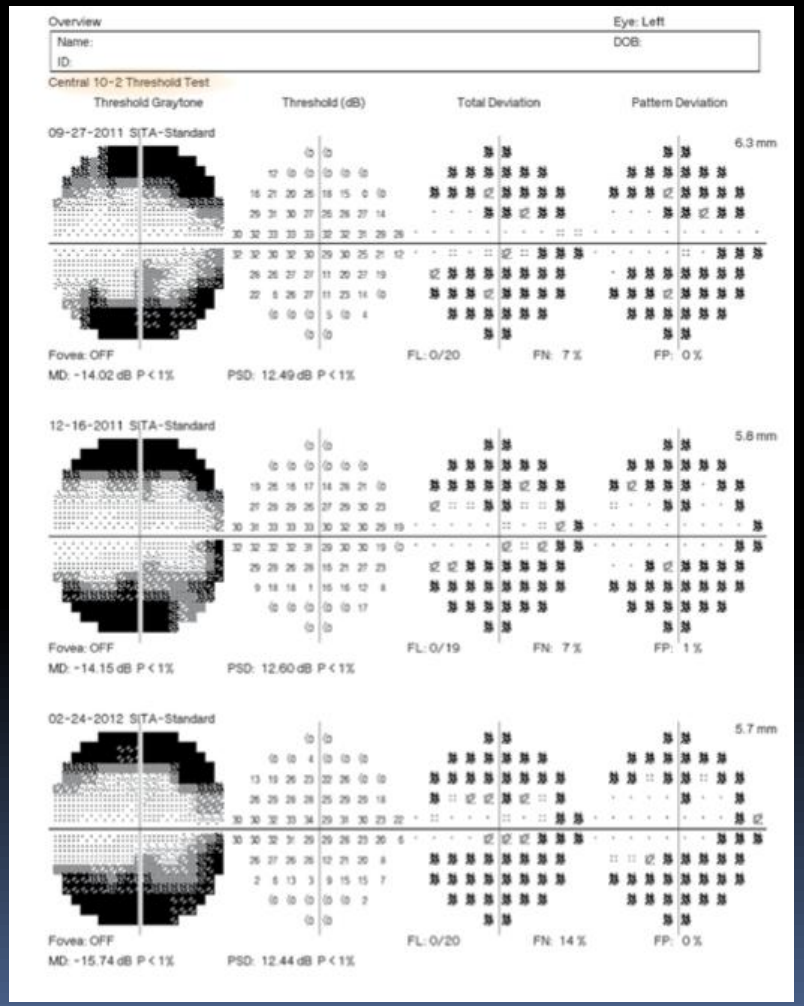


Image courtesy A.Heijl

24-2 program



10-2 program



Den gode undersøgelse
Fokuspunkter

”The key to positive patient performance lies in staff behaviour, attitudes and skill”

- Refraktion
- Patient instruktion
- Patient og linse position
- Reducer variabiliteten

Korrekt refraktion

- Brillemåling
- Autorefraktion
- Visus
- Læsekorrektion (tynde glas)

Korrektion

- 30-40yrs +1.0
- 40-45yrs +1.5
- 45-50yrs +2.0
- 50-55yrs +2.5
- 55-60yrs +3.0
- >60yrs +3.25

Bemærk: Fiksationskryds skal være i fokus

Patient instruktion

I) Kig altid på centrum hvor de grønne fixationsmål er

II) Tryk på knappen når du tror, du har set lys

III) Luk øjet eller hold knappen nede, hvis du har behov for en pause. Maskinen fortsætter når du åbner øjet eller slipper knappen.

IV) Du kan ikke lave fejl!

Patient position

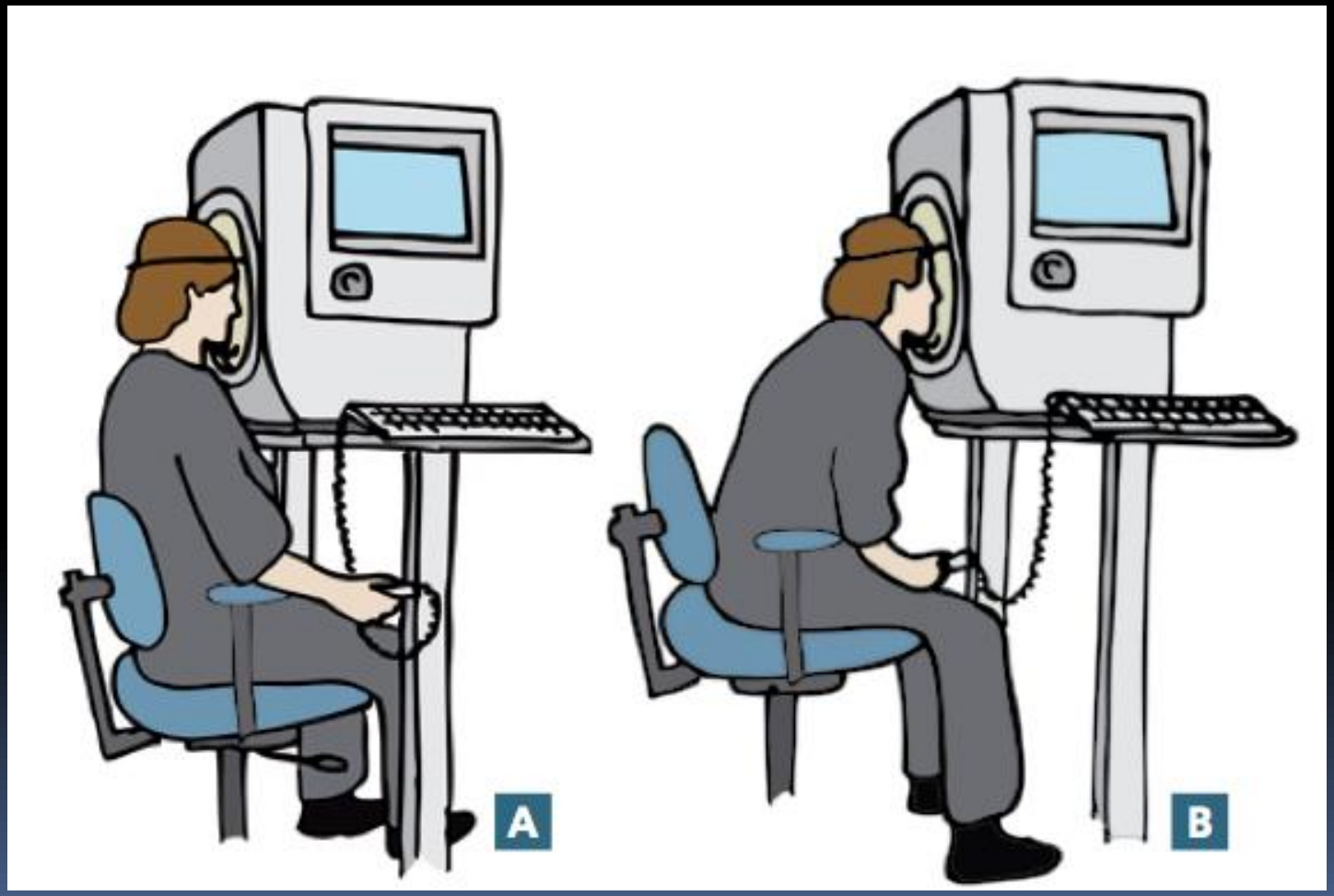
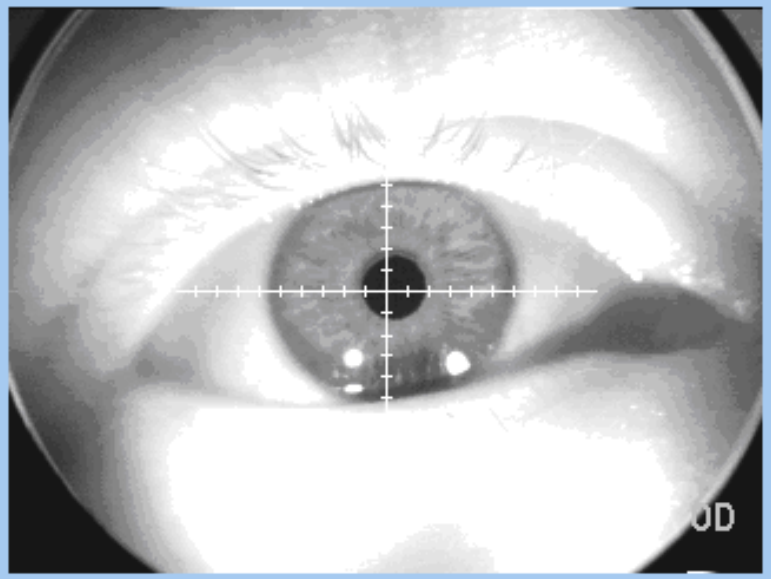
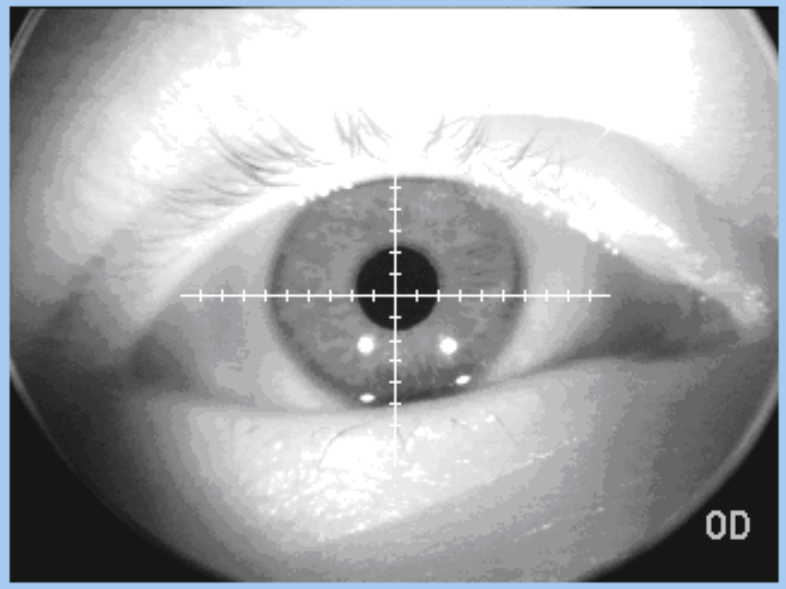


Image courtesy A. Heijl

Linse position

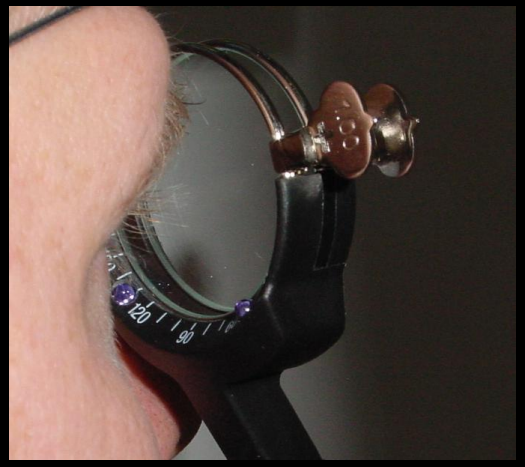


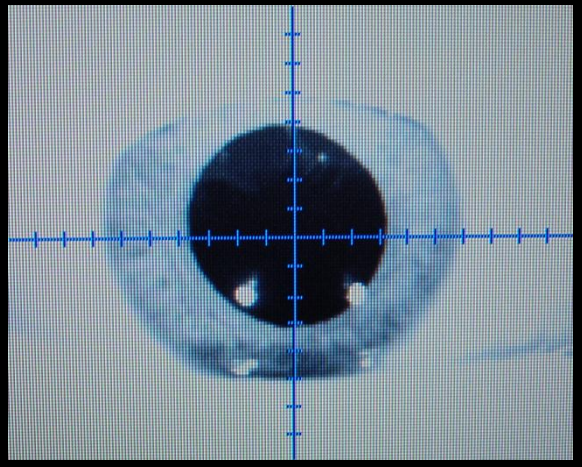
Refractive lens position is correct

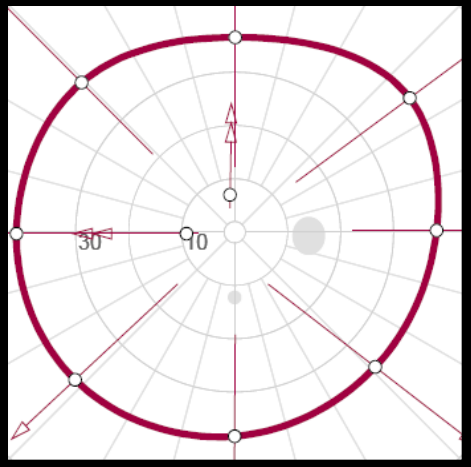


Refractve lens position is out of tolerance

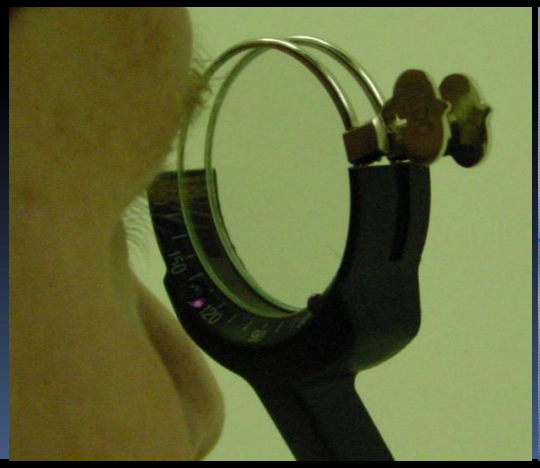
Korrekt øje-glas-afstand: 15mm

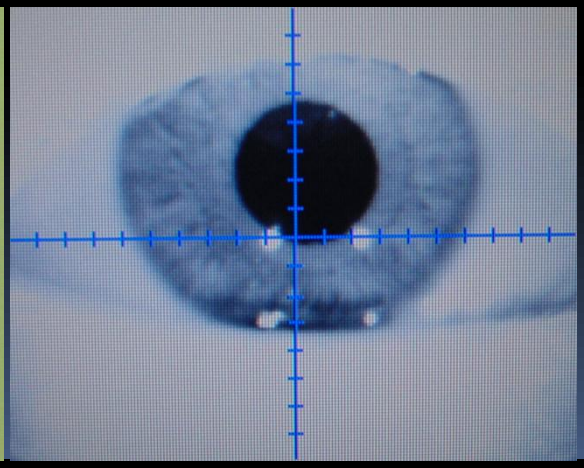


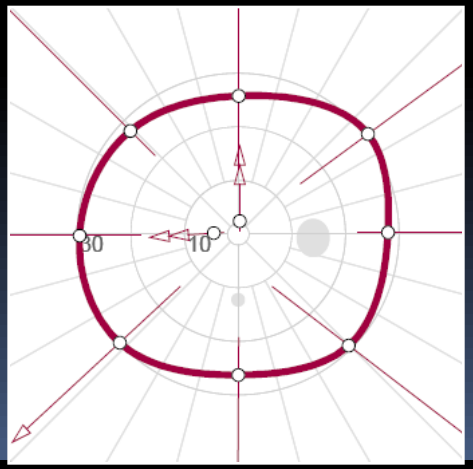




Korrekt afstand: Fuldt synsfelt

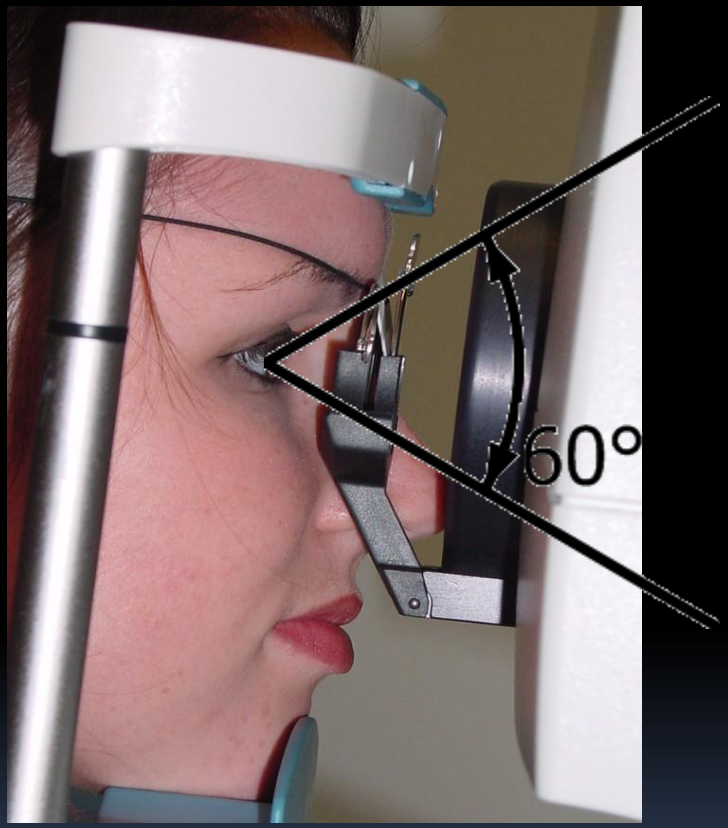


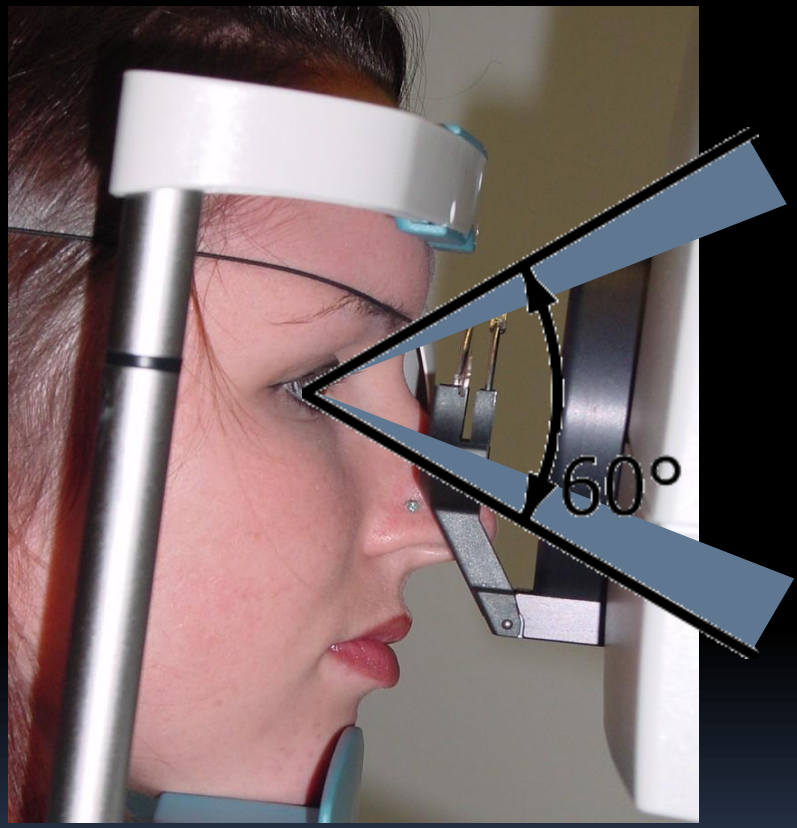




For lang afstand: Linse artefakter

Linse fejl



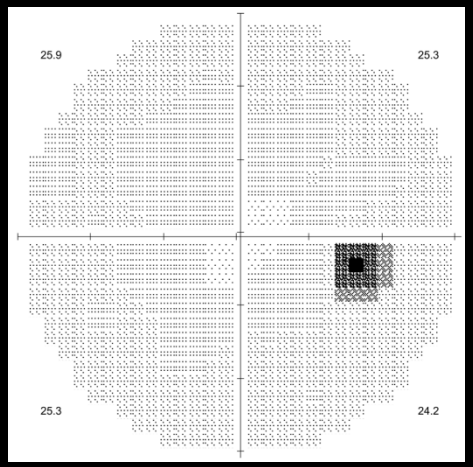


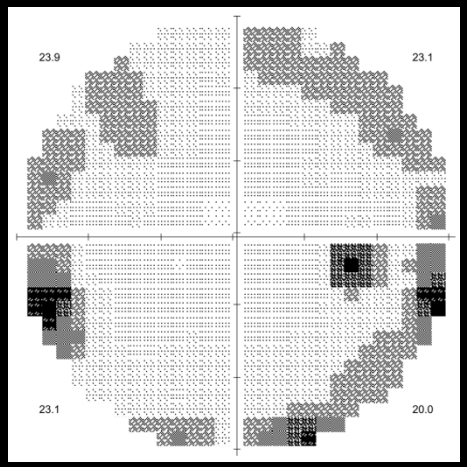
OK: ~1.5cm afstand

For langt væk

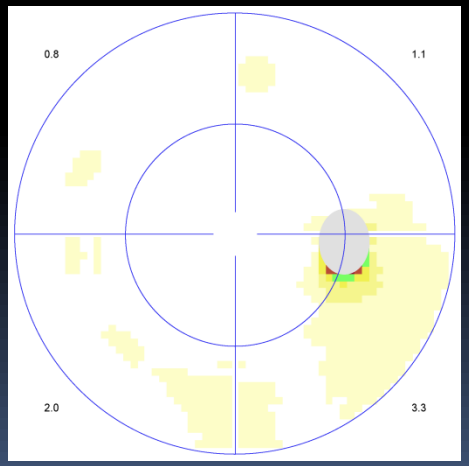
Linse fejl

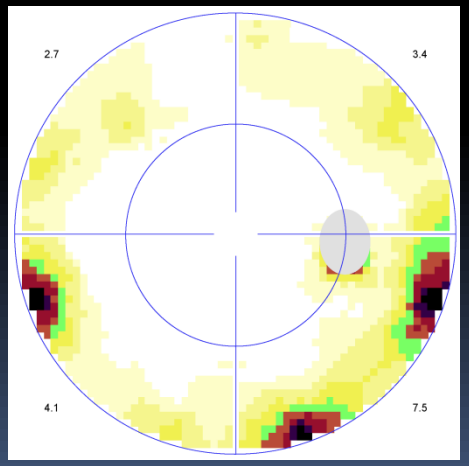
EyeSuite
HFA-Style
GS(VA)





EyeSuite
Octopus-Style
GS(CO)



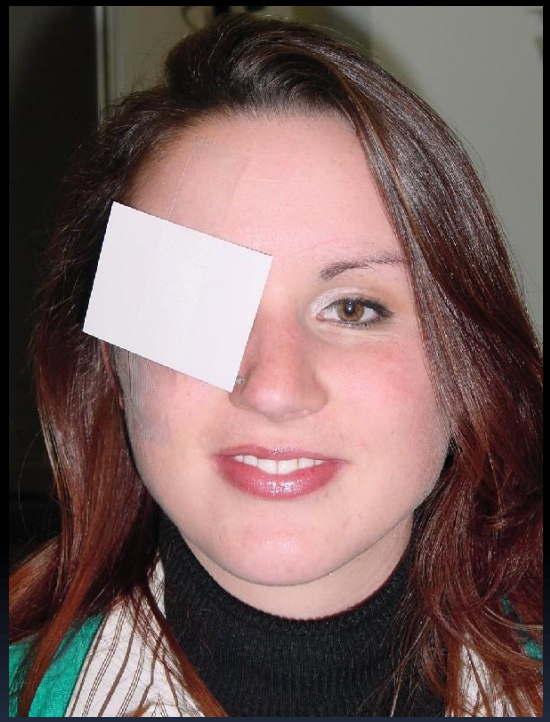


Korrekt

For langt væk

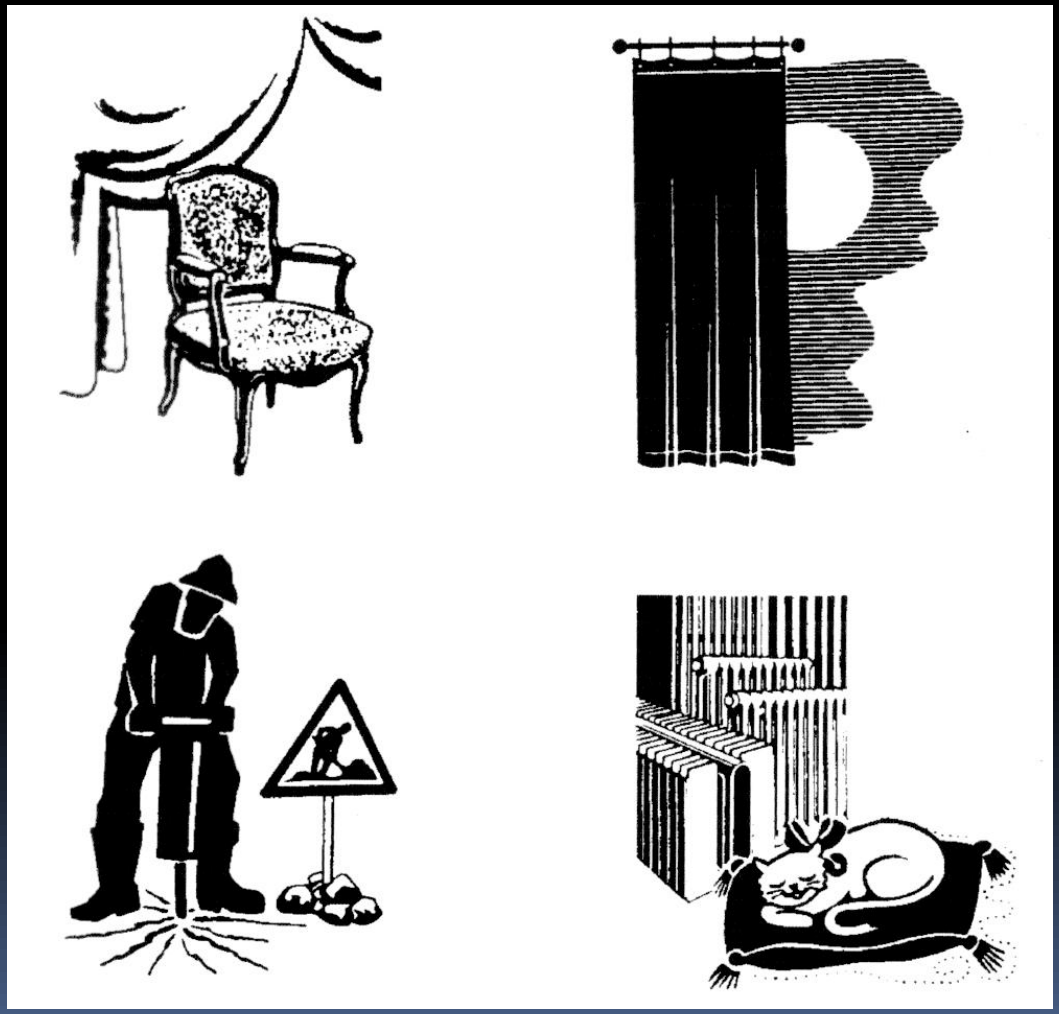
Øjenklap: → Hvid

OK



OK

Ikke OK



Prøv at undgå

- Larm
- Varme
- Kulde
- Lys-variation

Vigtige fokus-punkter

- Reducere variationen fra gang til gang
  - Øjenklap
  - Korrekt refraktion
  - Korrekt øjen-glas-afstand
  - Undgå distraherende faktorer
  - Vær opmærksom på falsk positiv raten
  - Patient-instruktion

Tolkning af perimetri

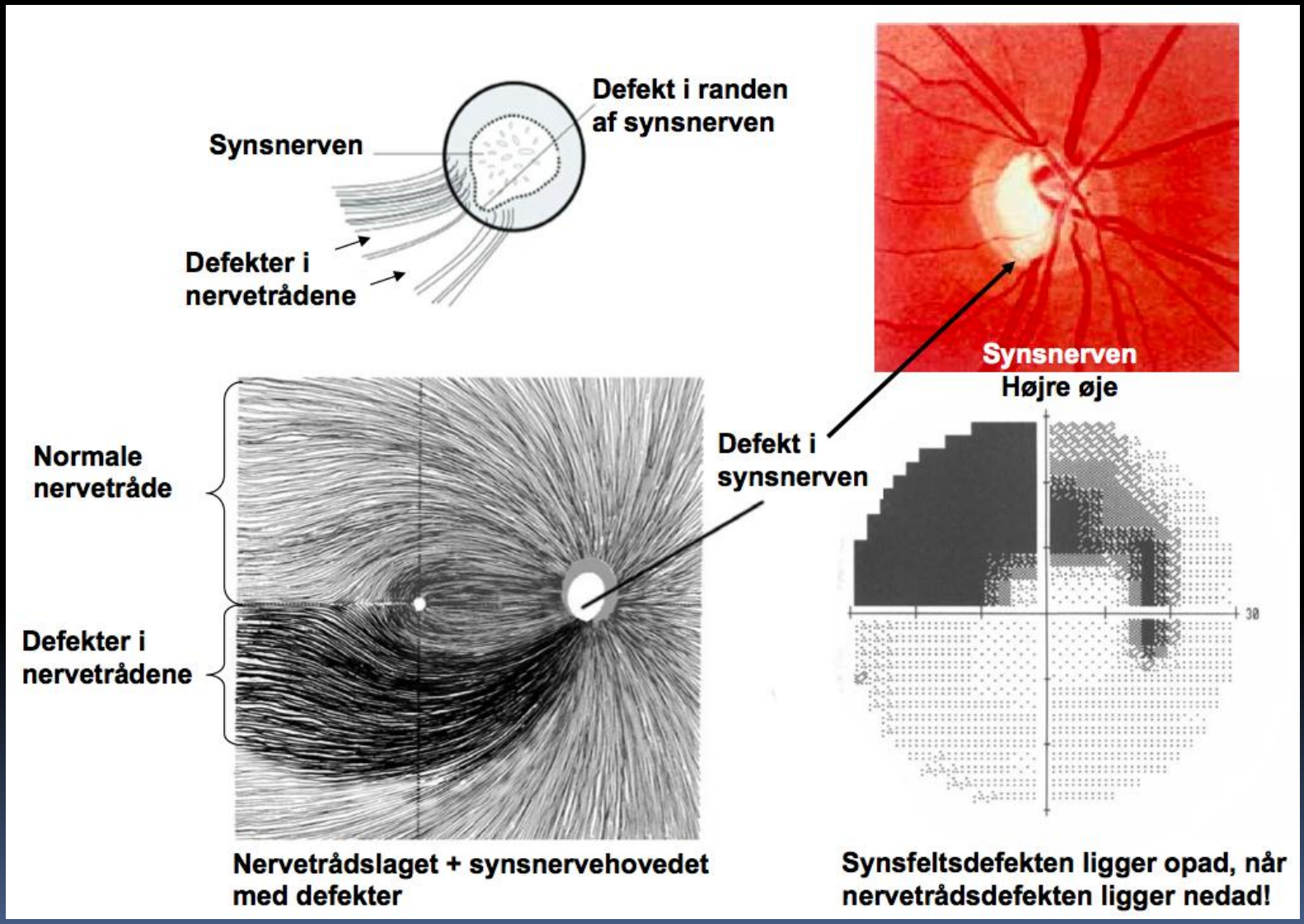


Image courtesy John Thygesen

EyeSuite™

HAAG-STREIT INTERNATIONAL

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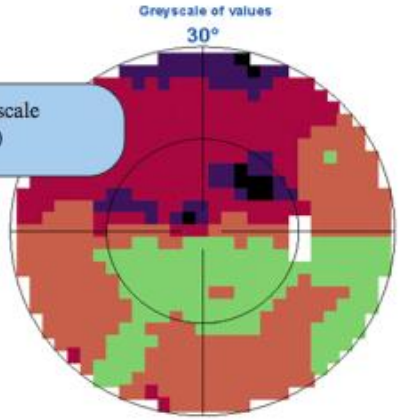
CH-3098 Koeniz
Switzerland

+41 31 978 01 11
info@haag-streit.ch
www.haag-streit.com

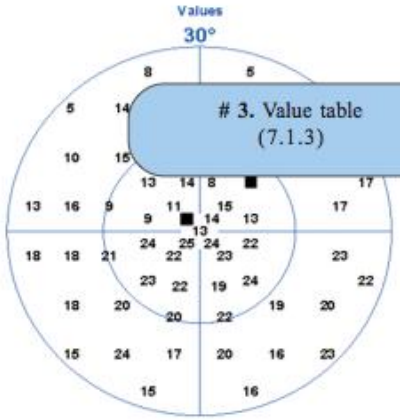
Name:	**Case**	Eye / Pupil[mm]:	**Right(OD) / 4.7**
First name:	Glaucoma	Date / Time:	18.04.1991 09:31
ID #:		Test duration:	13:07
Birthdate:	23.12.1922	Program / Code:	G1X / 3
	68	# Stages / Phases:	
	male	Strategy / Method:	
	/ /	Test target / duration:	
		Background:	
IOP:	29	# Questions / Repetitions:	402 / 12
Diagnostics:	Glaucoma	# Catch trials:	pos 1 / 20, neg 3 / 21
Patient file:			

 # 1. Patient data (7.1.1)

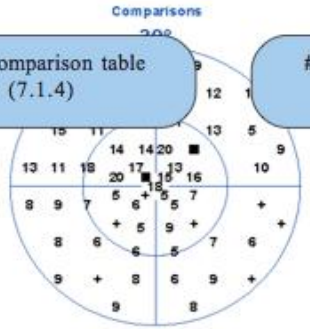
 # 2. Examination data (7.1.2)



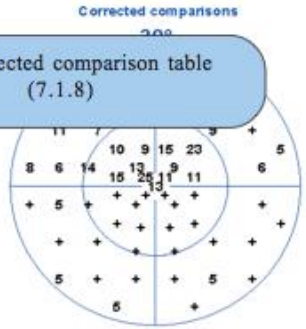
 # 5. Grey scale (7.1.5)



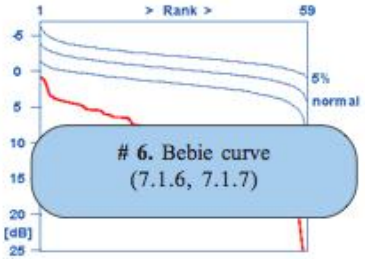
 # 3. Value table (7.1.3)



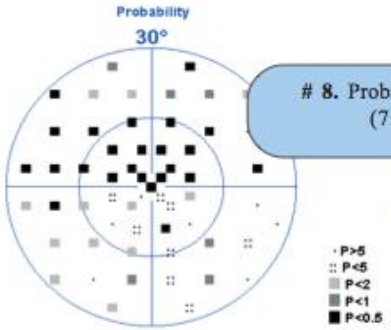
 # 4. Comparison table (7.1.4)

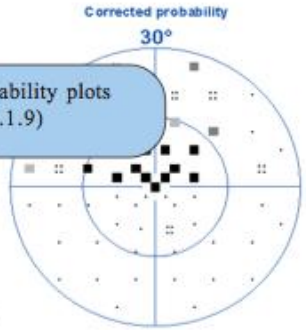


 # 7. Corrected comparison table (7.1.8)



 # 6. Bebie curve (7.1.6, 7.1.7)





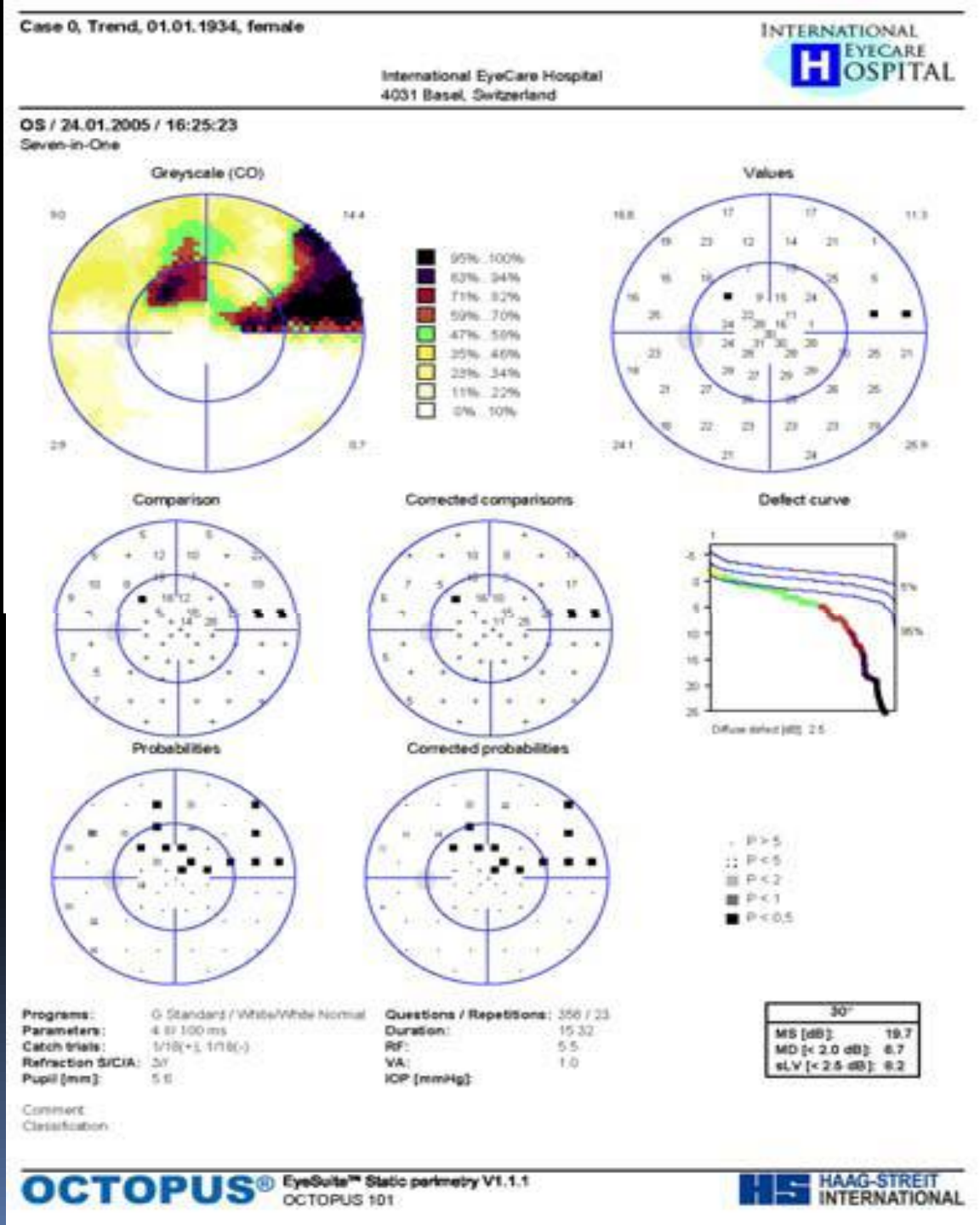
 # 8. Probability plots (7.1.9)

Deviation [dB] 4.2

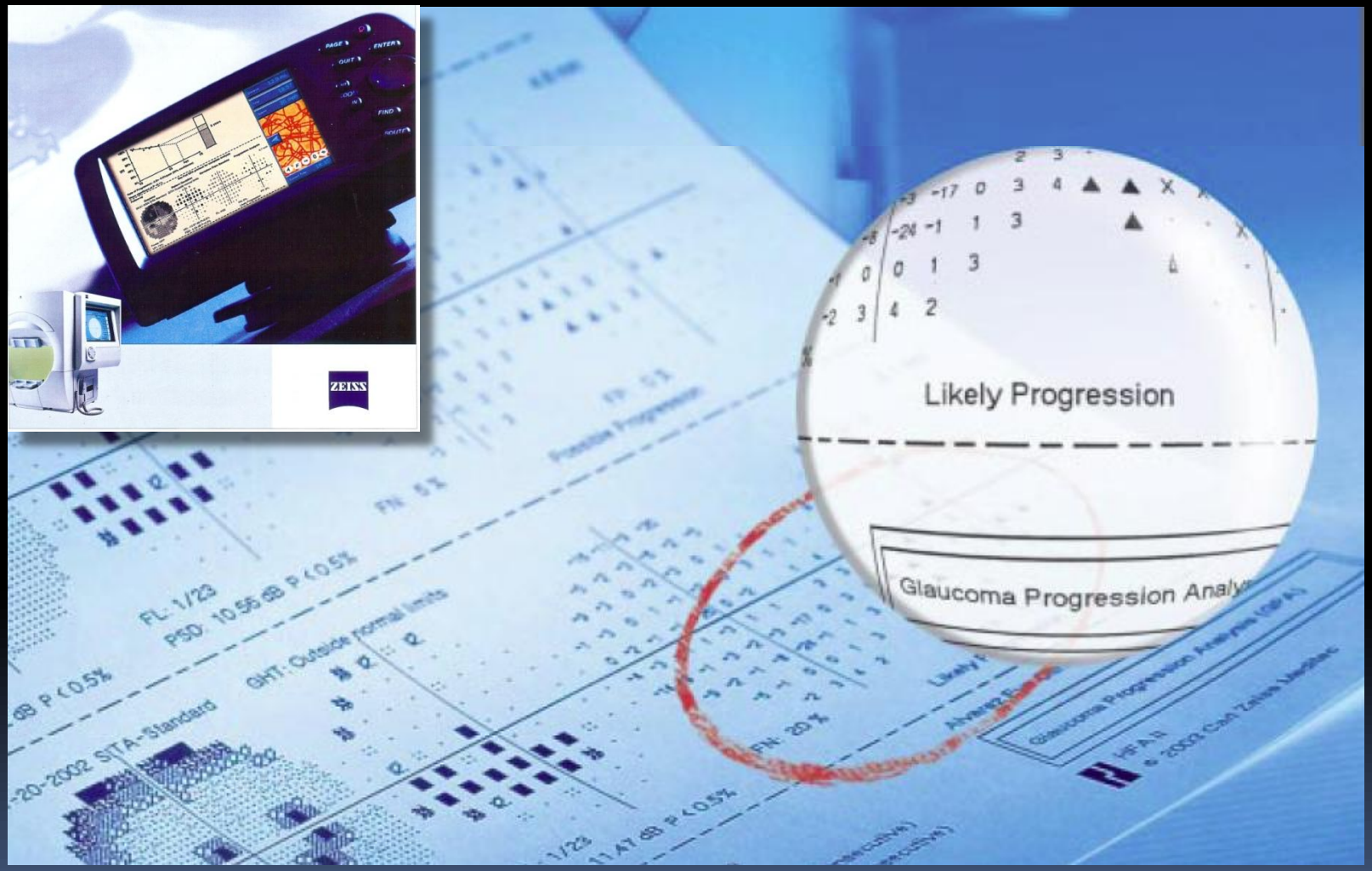
 # 9. Visual Field indices (7.2)

	Phase 1	Phase 2	Mean
#	59	32	32
MS	16.3	16.5	16.9
MD	10.2	10.3	10.0
LV	38.5	40.2	41.0
CLV			37.6
SF			2.7
RF			9.8

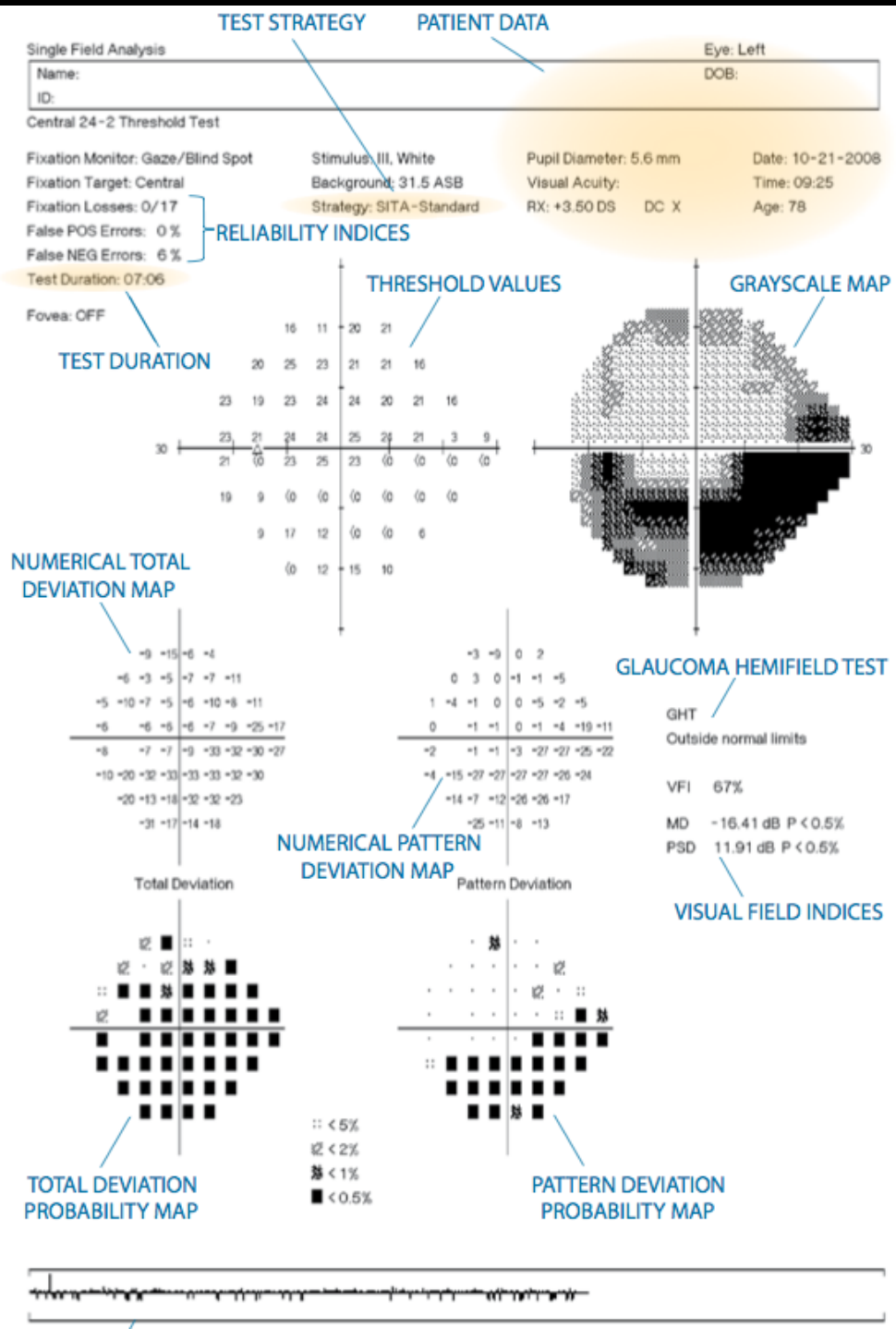
7-1 udprint


Case 0, Trend, 01.01.1934, female
INTERNATIONAL EYECARE HOSPITAL
International EyeCare Hospital
4031 Basel, Switzerland
OS / 24.01.2005 / 16:25:23
Seven-in-One
Greyscale (CO)
Values
Comparison
Corrected comparisons
Defect curve
Probabilities
Corrected probabilities
Programs:
Parameters:
Catch trials:
Refraction S/C/A:
Pupil [mm]:
Questions / Repetitions:
Duration:
RF:
VA:
IOP [mmHg]:
Comment
Classification
30°
MS [dB]: 19.7
MD [< 2.0 dB]: 6.7
sLV [< 2.5 dB]: 6.2
OCTOPUS®
EyeSuite™ Static perimetry V1.1.1
OCTOPUS 101
HAAG-STREIT INTERNATIONAL

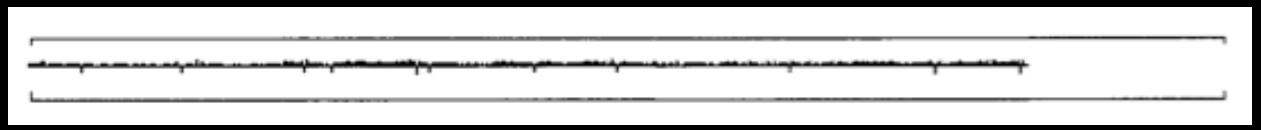
Glaucoma Progression Analysis™ (GPA™) Software

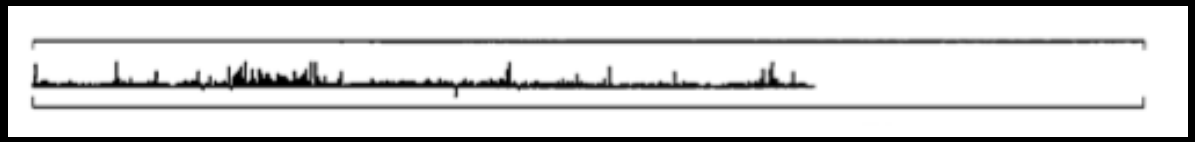


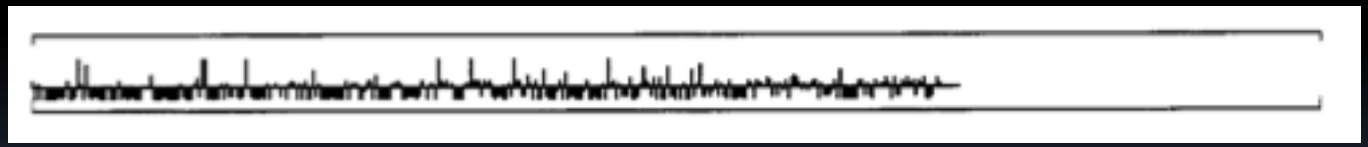
Humphrey® Field Analyzer HFA II-i


TEST STRATEGY
PATIENT DATA
Single Field Analysis
Eye: Left
Name:
DOB:
ID:
Central 24-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 0/17
False POS Errors: 0 %
False NEG Errors: 6 %
Test Duration: 07:06
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard
Pupil Diameter: 5.6 mm
Visual Acuity:
RX: +3.50 DS
DC X
Date: 10-21-2008
Time: 09:25
Age: 78
RELIABILITY INDICES
TEST DURATION
THRESHOLD VALUES
GRAYSCALE MAP
NUMERICAL TOTAL DEVIATION MAP
NUMERICAL PATTERN DEVIATION MAP
GLAUCOMA HEMIFIELD TEST
GHT
Outside normal limits
VFI 67%
MD -16.41 dB P < 0.5%
PSD 11.91 dB P < 0.5%
VISUAL FIELD INDICES
Total Deviation
Pattern Deviation
:: < 5%
< 2%
< 1%
< 0.5%
TOTAL DEVIATION PROBABILITY MAP
PATTERN DEVIATION PROBABILITY MAP

Fiksationsstabiliteten







Rate of Progression (ROP)

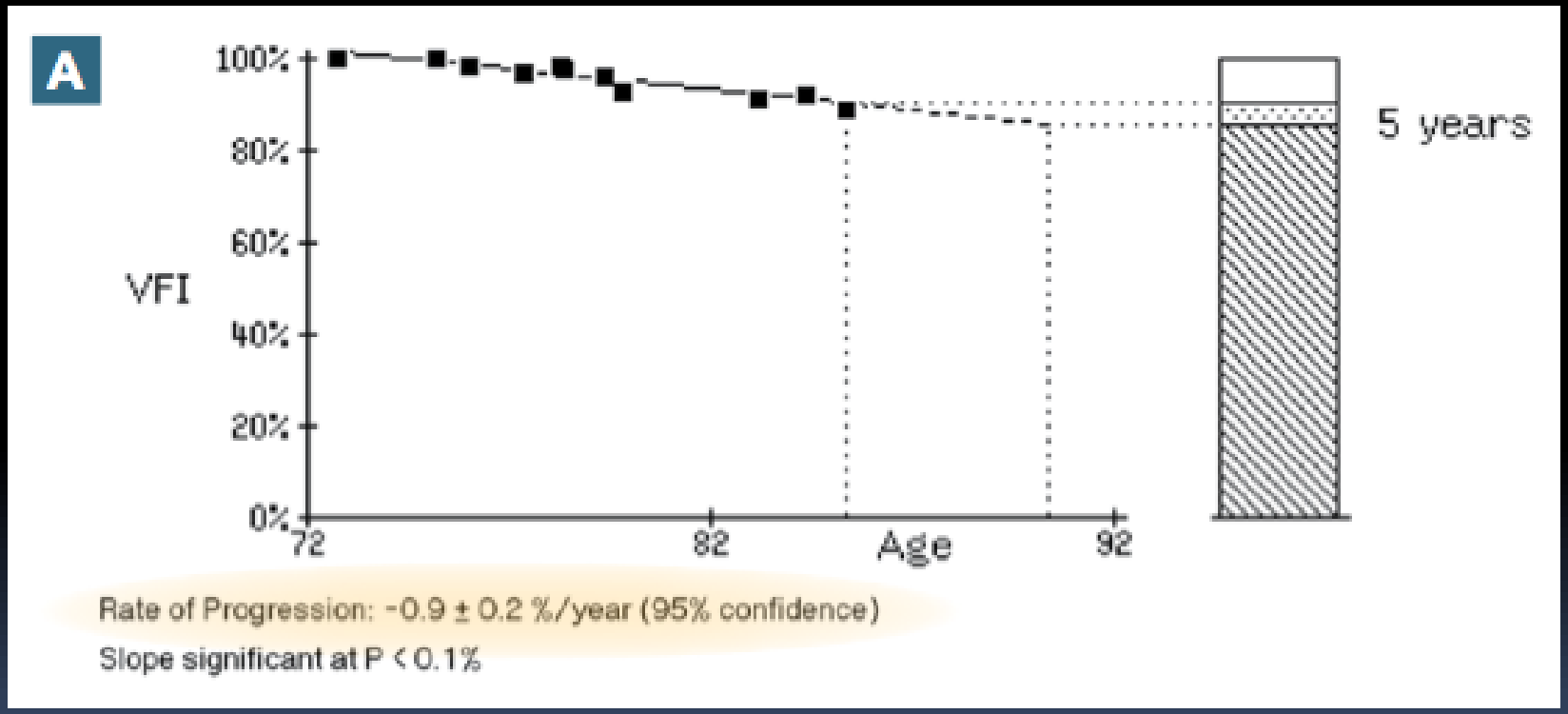
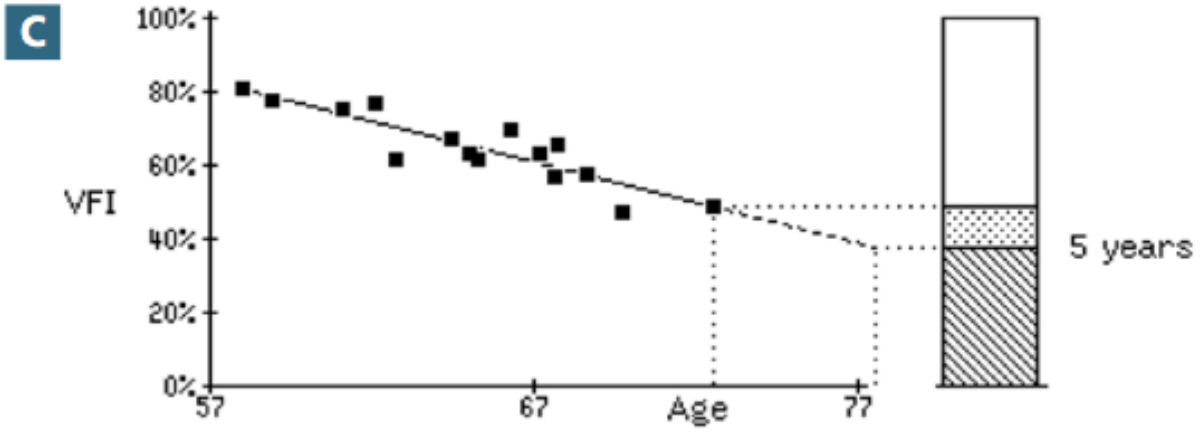
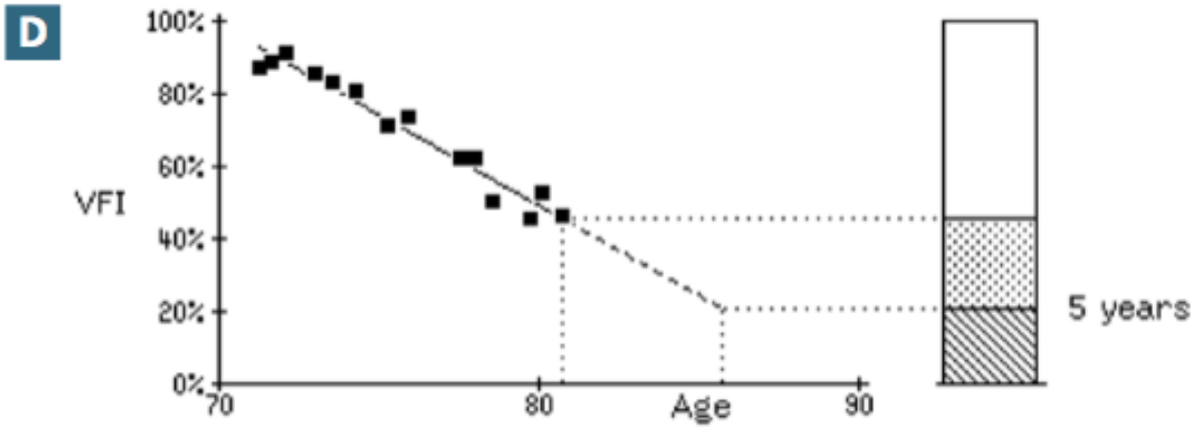


Image courtesy A. Heijl

Rate of Progression



Rate of Progression: -2.2 ± 0.7 %/year (95% confidence)
Slope significant at P < 0.1%



Rate of Progression: -5.0 ± 0.7 %/year (95% confidence)
Slope significant at P < 0.1%

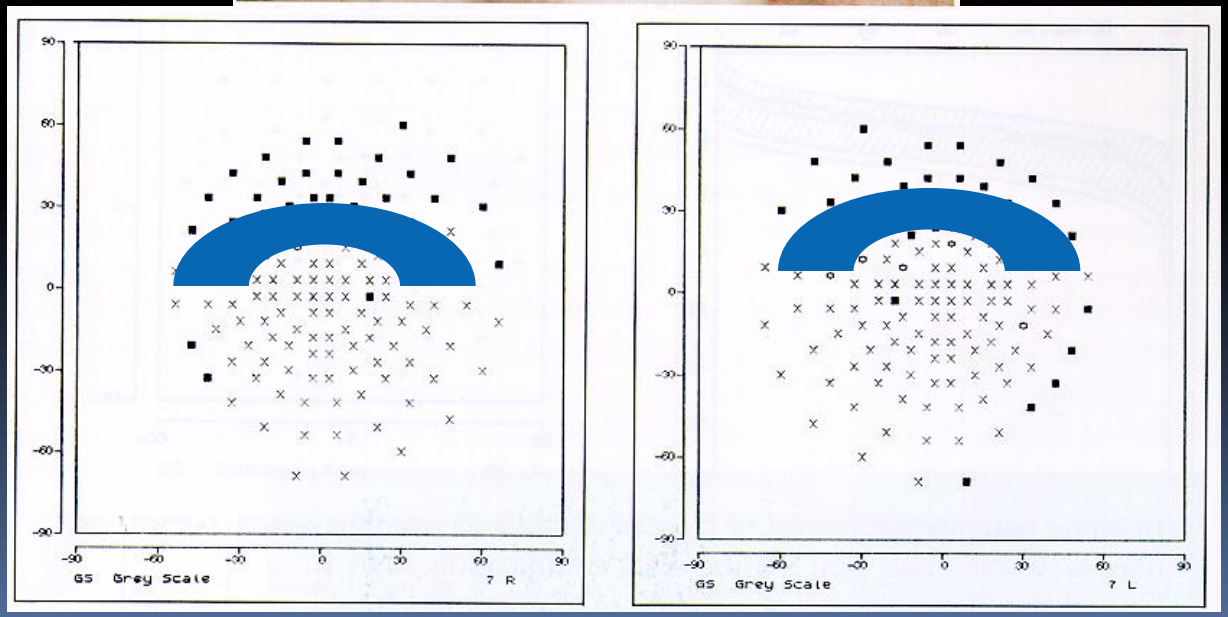
Image courtesy A. Heijl

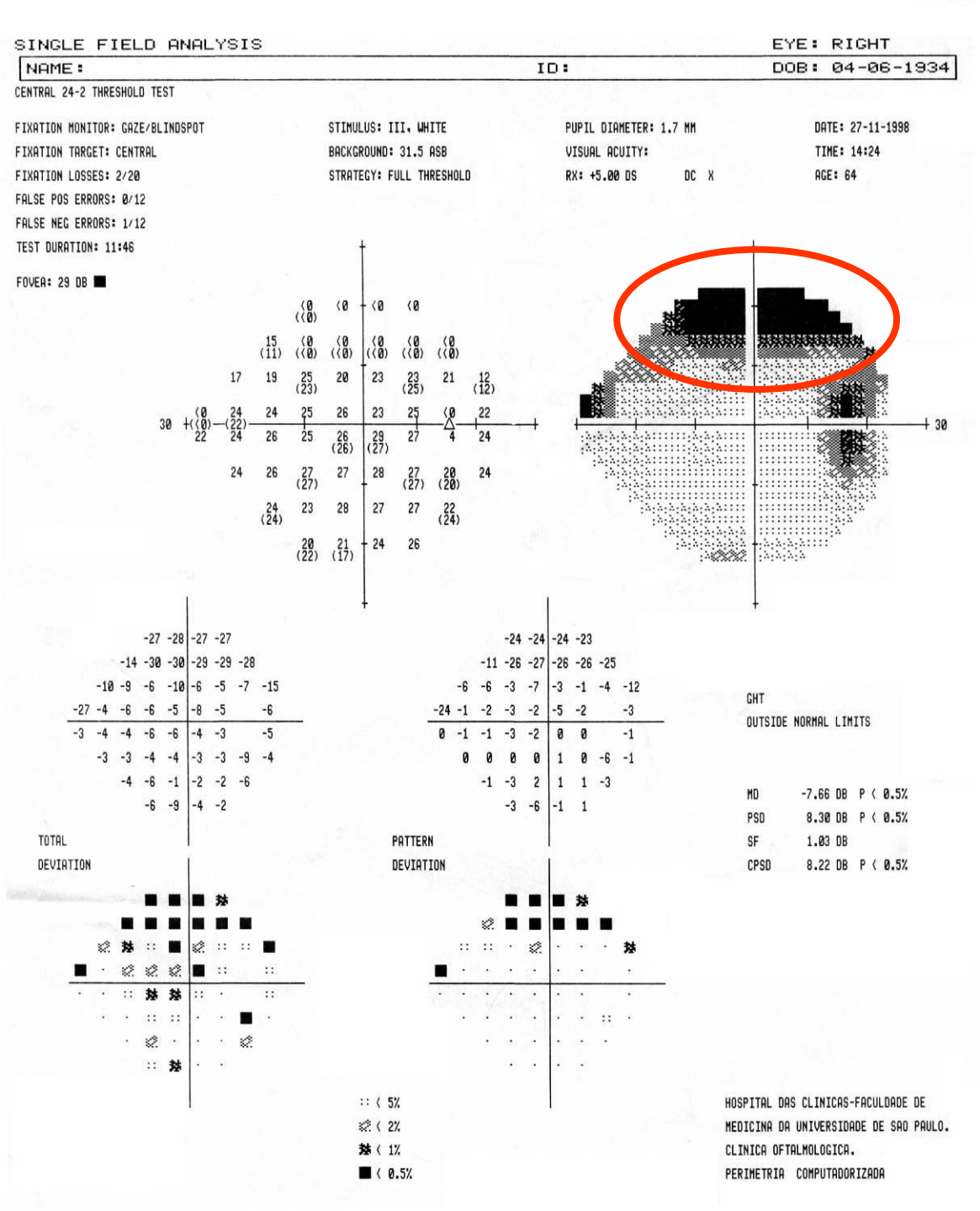
Fokuspunkter for perimetristen under undersøgelsen

- Ptose (hængende øjenlåg)
- Falsk Positiv raten

Tolkning af resultater

Ptosis





Øjenlågs artefarkt

Ældre patienter

Blepharoptosis eller dermatochalasis

Superior reduktion i sensitiviteten

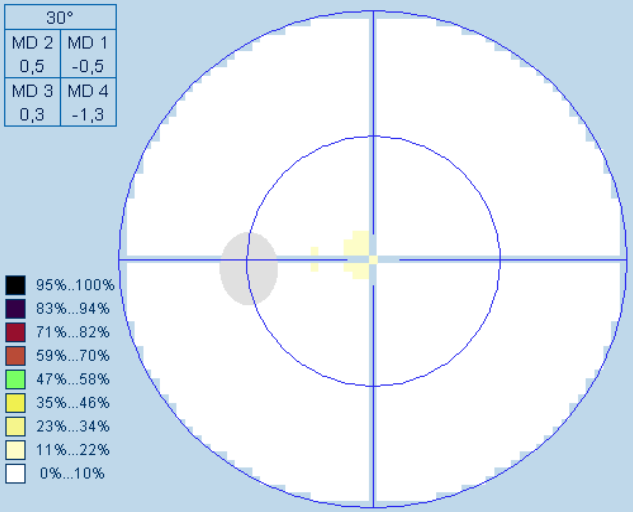
Disse artefakter bør opdages af perimetristen og undersøgelsen gentages

Trigger Happy
”Hvide scotomer”

Patient / Worklist Management | Both eyes

OS 04-09-2014 10:55:08
Greyscale (CO)

30°	
MD 2 0,5	MD 1 -0,5
MD 3 0,3	MD 4 -1,3

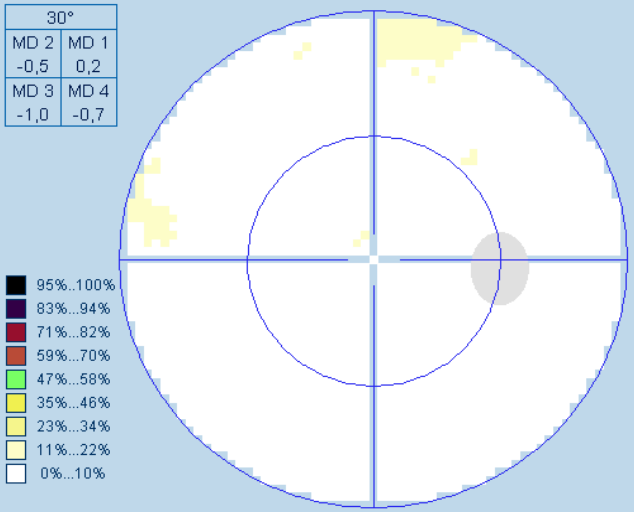


Eye / Pupil [mm]:	Left eye (OS) / 5.8
Test duration:	02:59
Program / strategy:	G / TOP
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	72 / 3
Catch trials:	2/7 (29%) +, 0/7 (0%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		28,8
MD [dB]	-2..2	-0,2
sLV [dB]	0..2.5	2,0
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		14,2

OD 04-09-2014 10:41:05
Greyscale (CO)

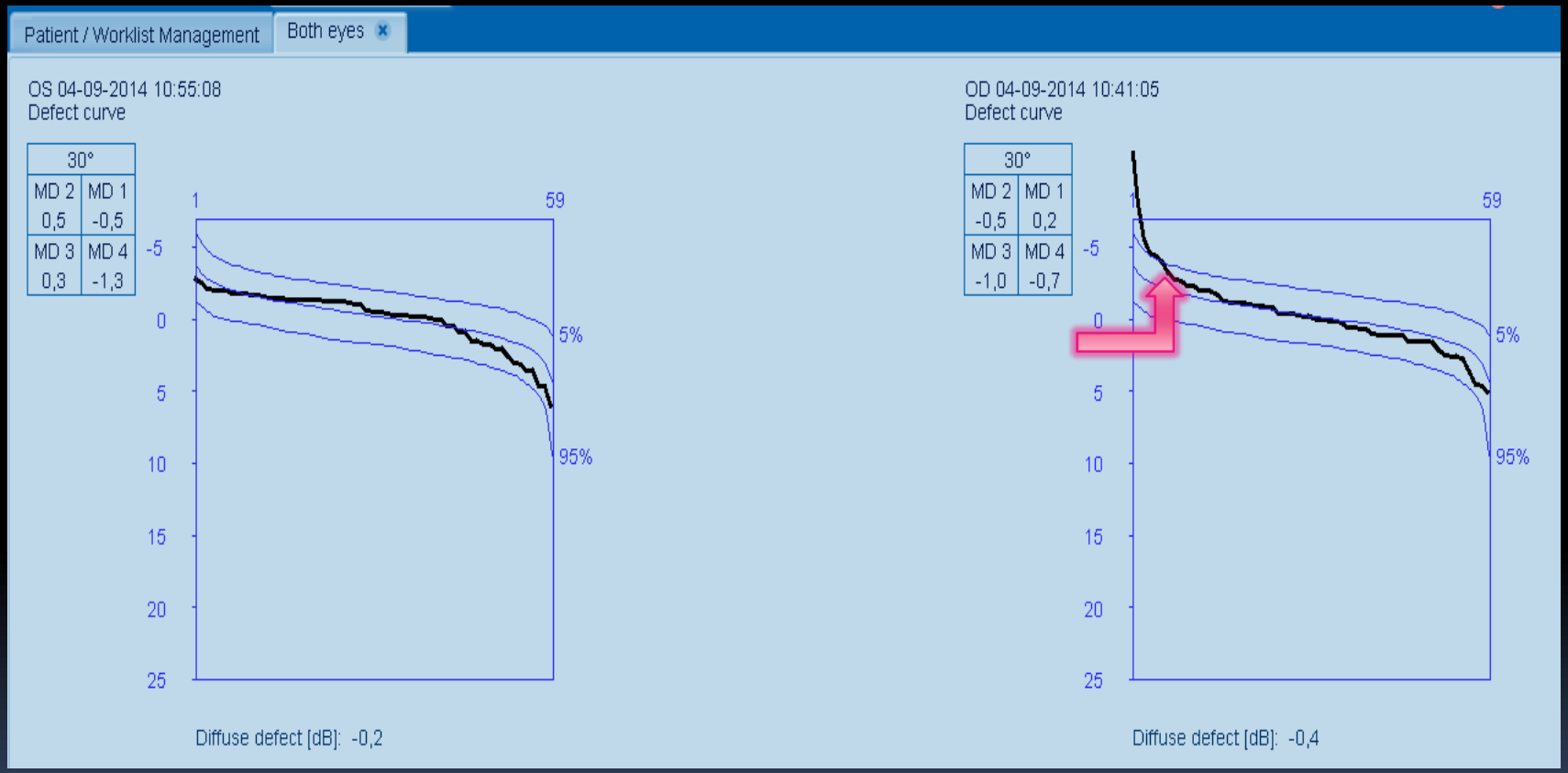
30°	
MD 2 -0,5	MD 1 0,2
MD 3 -1,0	MD 4 -0,7



Eye / Pupil [mm]:	Right eye (OD) /
Test duration:	08:42
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	220 / 0
Catch trials:	4/11 (36%) +, 0/11 (0%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		29,1
MD [dB]	-2..2	-0,5
sLV [dB]	0..2.5	2,8
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		18,1

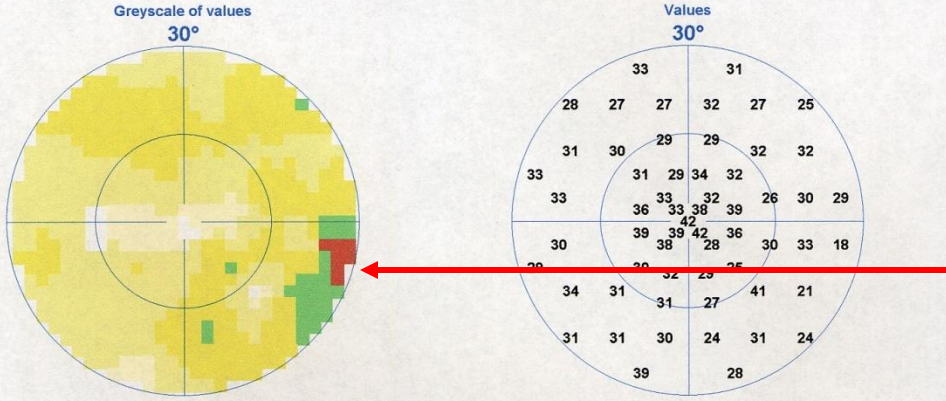
Trigger Happy
Venstre forskudt kurve



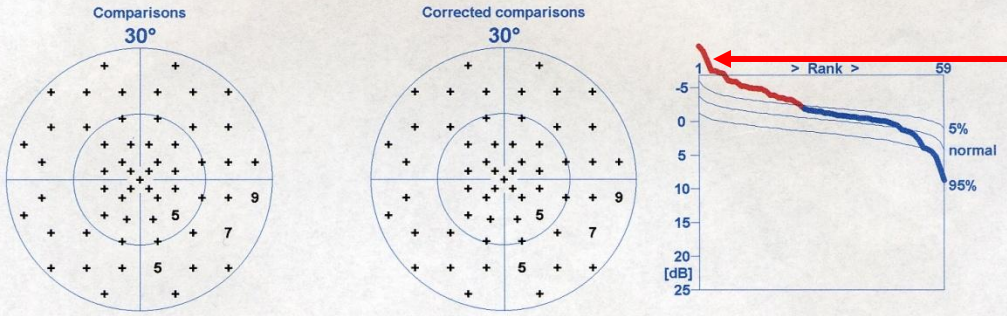
INTERZEAG OCTOPUS 101 V 3.16f
Seven-in-One

Department of Ophthalmology
Rigshospitalet, Copenhagen

Name:		Eye / Pupil[mm]:	**Left (OS) / 6.0**
First name:		Date / Time:	28-01-2005 14:12
ID #:		Test duration:	13:42
Birthdate:	13-10-1973	Program / Code:	dG2 / 0
Age:	31	# Stages / Phases:	9 / 3
Sex:	male	Strategy / Method:	Dynamic / Normal
Refr. S / C / A:	CL / /	Test target / duration:	III / 100 ms
Acuity:	6/4,5	Background:	4 asb
IOP:	/lk	# Questions / Repetitions:	363 / 2
Diagnostics:		# Catch trials:	pos 12 / 18, neg 0 / 19

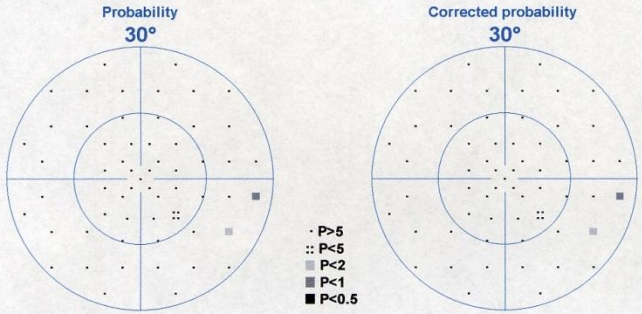


Nasal step



Trigger happy

Deviation [dB] 0.0

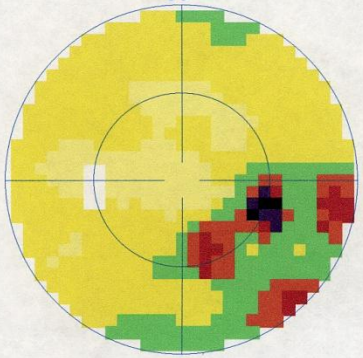


	Phase 1	Phase 2	Mean
#	59	59	59
MS	30.1	31.7	30.9
MD	-1.2	-2.7	-1.9
LV	18.7	19.7	16.0
CLV			12.8
SF			2.8
RF			32.4

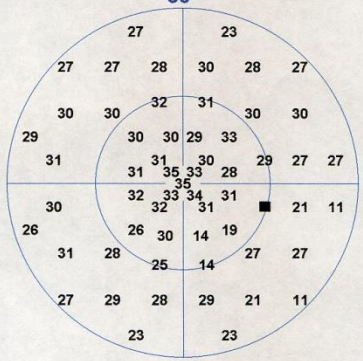
INTERZEAG OCTOPUS 101 V 3.16f Department of Ophthalmology
Seven-in-One Rigshospitalet, Copenhagen

Name:		Eye / Pupil[mm]:	**Left (OS) / 6.9**
First name:		Date / Time:	30-04-2004 09:15
ID #:		Test duration:	10:12
Birthdate:	13-10-1973	Program / Code:	dG2 / 0
Age:	30	# Stages / Phases:	9 / 3
Sex:	male	Strategy / Method:	Dynamic / Normal
Refr. S / C / A:	- 6.00 / - 1.00 / 69	Test target / duration:	III / 100 ms
Acuity:	6/4,5	Background:	4 asb
IOP:	/lk	# Questions / Repetitions:	332 / 3
Diagnostics:		# Catch trials:	pos 2 / 17, neg 0 / 17

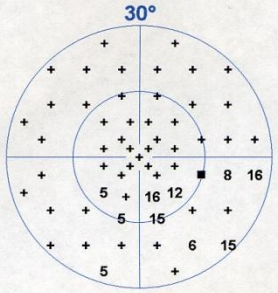
Greyscale of values



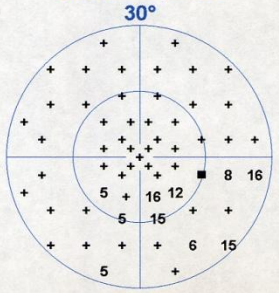
Values

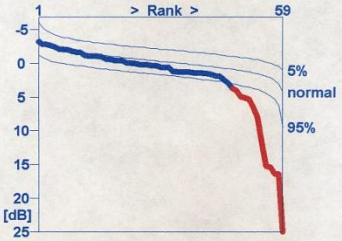


Comparisons



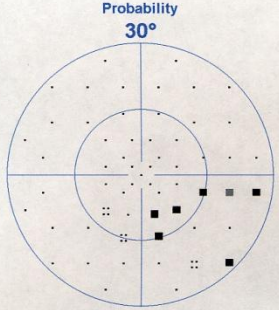
Corrected comparisons





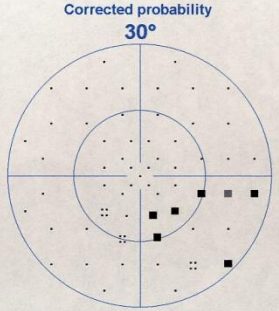
Deviation [dB] 0.0

Probability



· P>5
:: P<5
P<2
P<1
P<0.5

Corrected probability

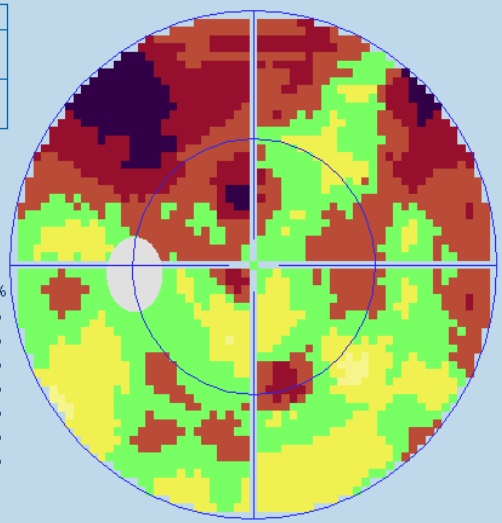


	Phase 1	Phase 2	Mean
#	59	59	59
MS	27.7	25.8	26.8
MD	1.3	3.2	2.3
LV	26.5	57.3	35.7
CLV			29.5
SF			3.8
RF			5.9

Patient / Worklist Management | Both eyes

OS 02-09-2014 14:11:47
Greyscale (CO)

30°	
MD 2	MD 1
17,8	15,5
MD 3	MD 4
13,9	13,6

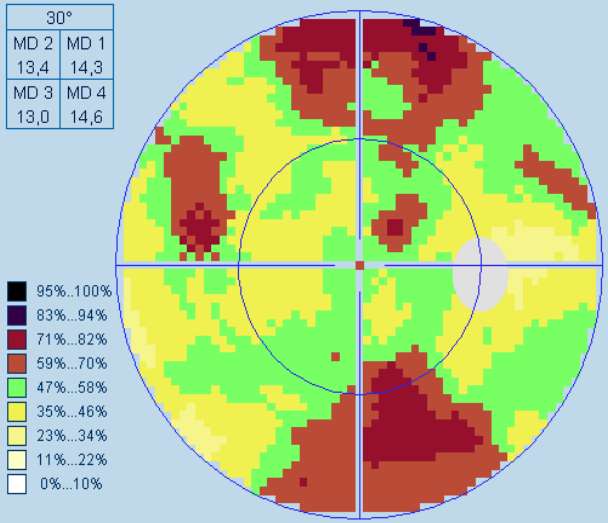


Eye / Pupil [mm]:	Left eye (OS) / 5.9
Test duration:	05:54
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	135 / 3
Catch trials:	0/7 (0%) +, 0/7 (0%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		12,4
MD [dB]	-2..2	15,2
sLV [dB]	0..2.5	3,8
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		0,0

OD 02-09-2014 14:01:12
Greyscale (CO)

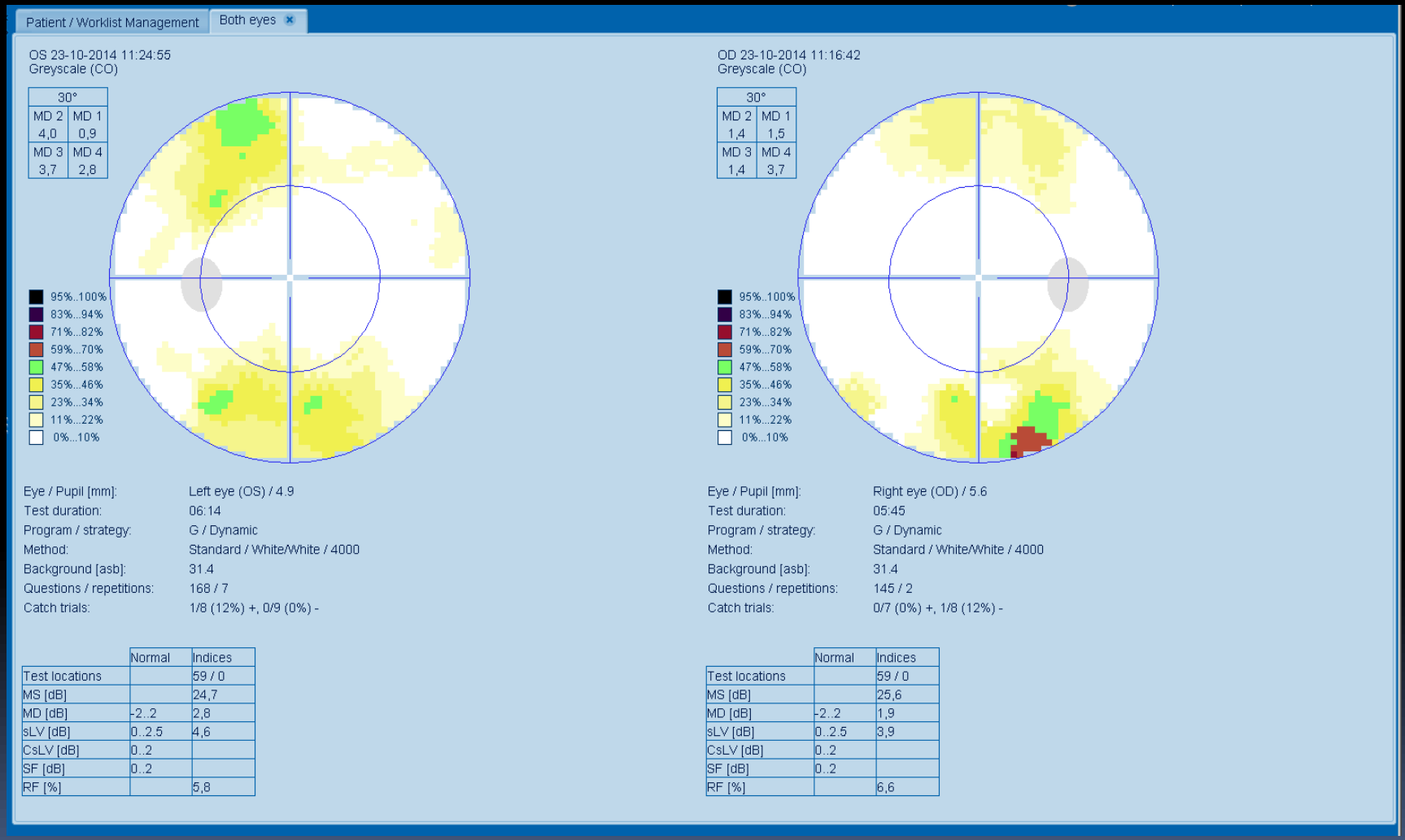
30°	
MD 2	MD 1
13,4	14,3
MD 3	MD 4
13,0	14,6

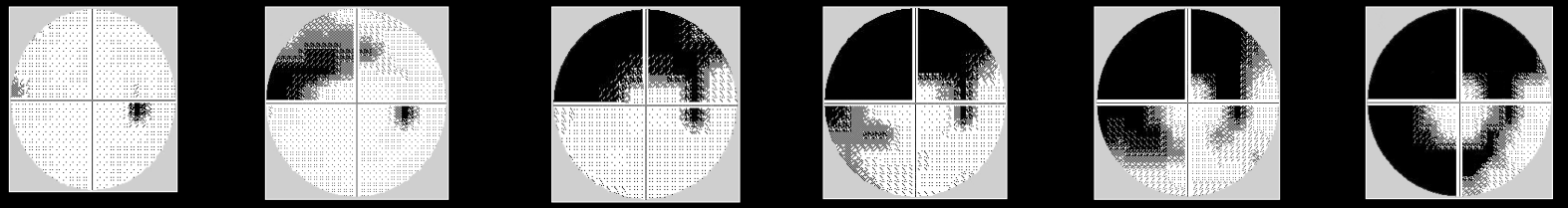


Eye / Pupil [mm]:	Right eye (OD) / 7.7
Test duration:	06:28
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	135 / 5
Catch trials:	0/7 (0%) +, 0/7 (0%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		13,7
MD [dB]	-2..2	13,9
sLV [dB]	0..2.5	3,3
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		0,0

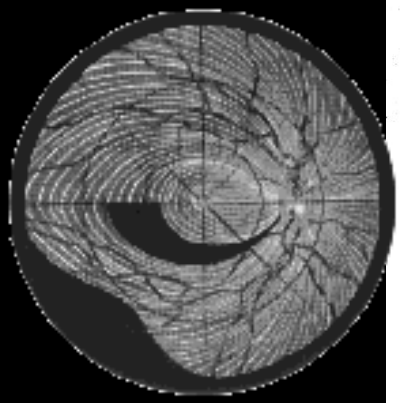
Forkert refraktionering:
+8 D anvendt i stedet for -8 D

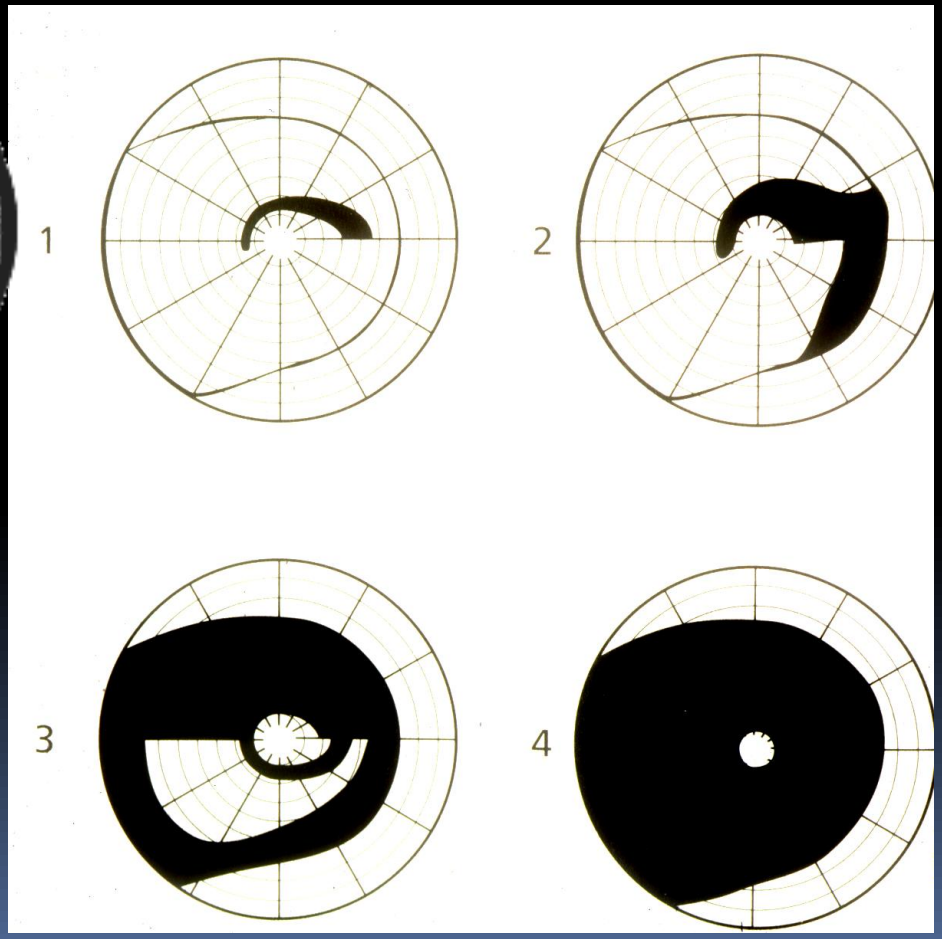




Glaucom er en progressiv sygdom

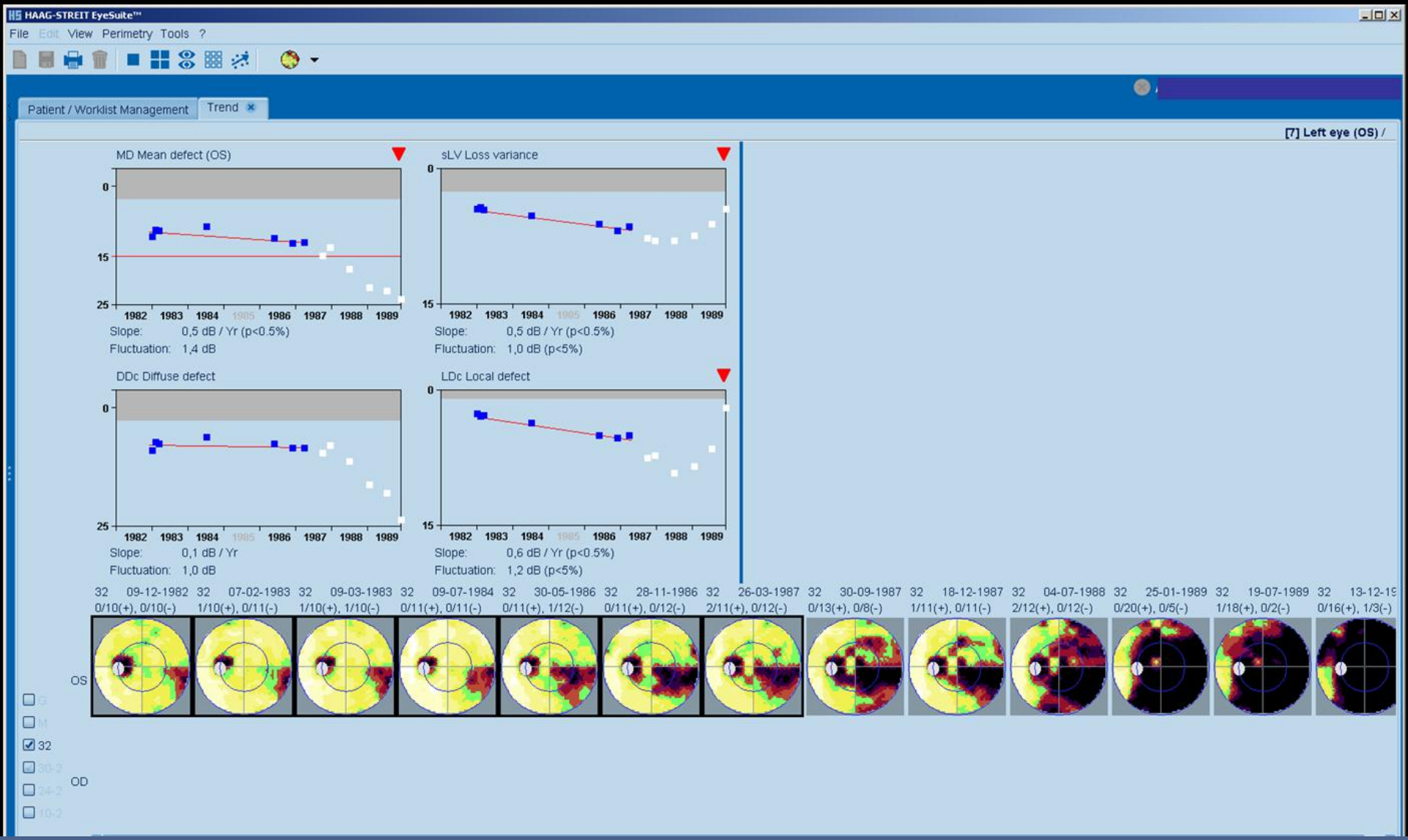
Karakteristisk udvikling af synsfeltsdefekter



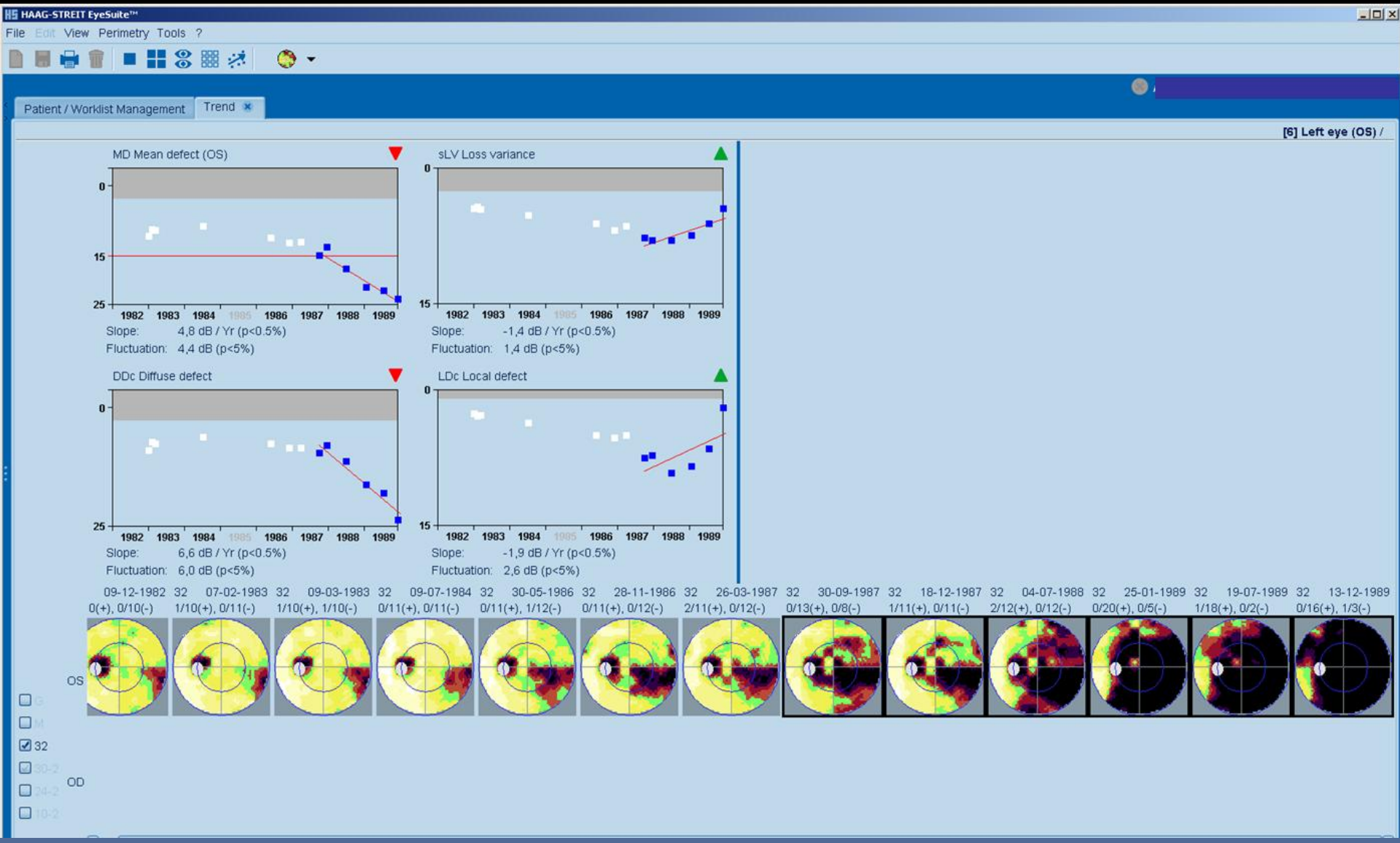


Normale øjne uden glaukom har et tab af sensitivitet på 0.07 dB/år

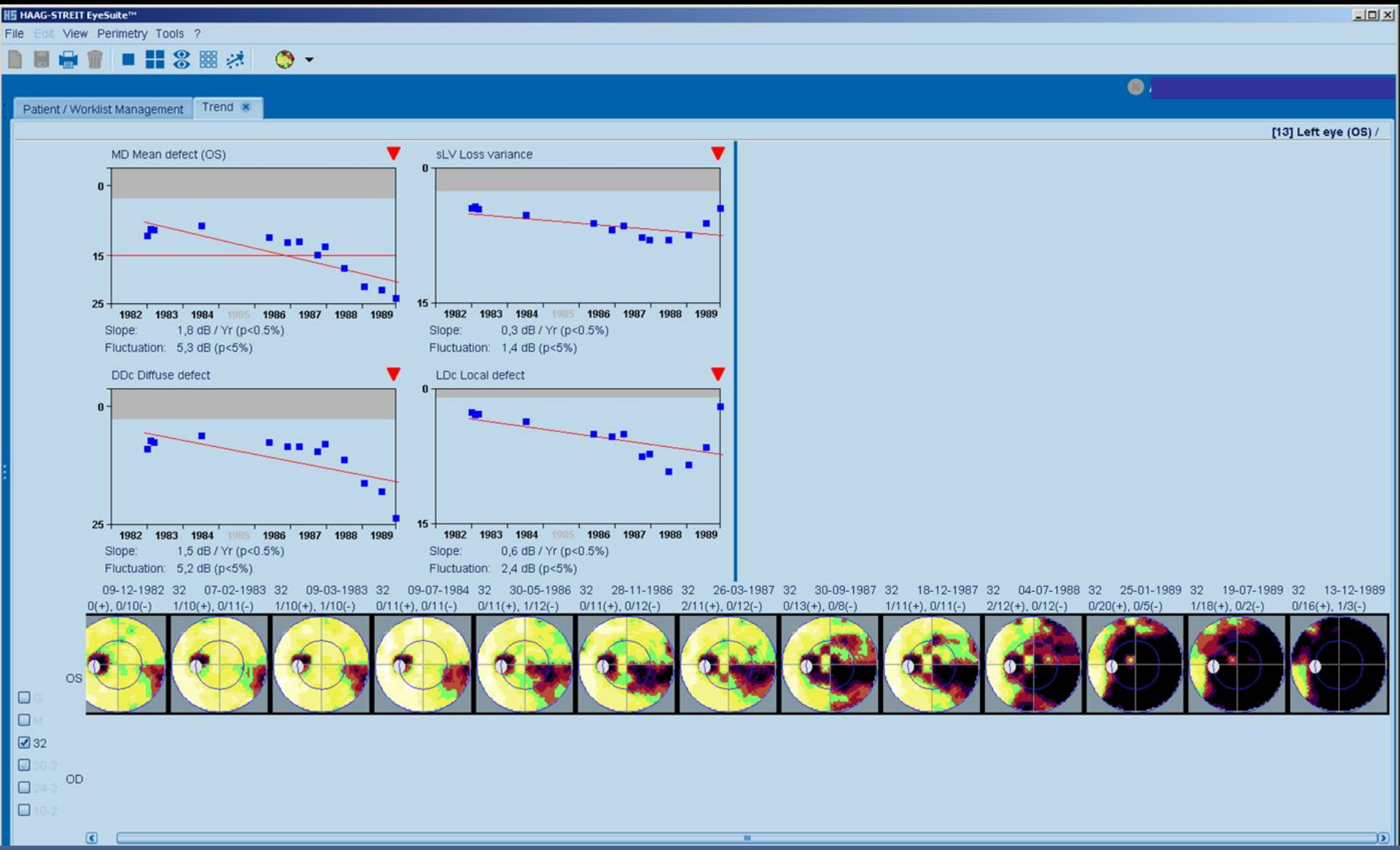
Progression de første 5 år: 0,5 dB/år



Progression de efterflg. 2 år: 4,0 dB/år



Progressionraten (ROP) over alle 7 år: 1,8 dB/år

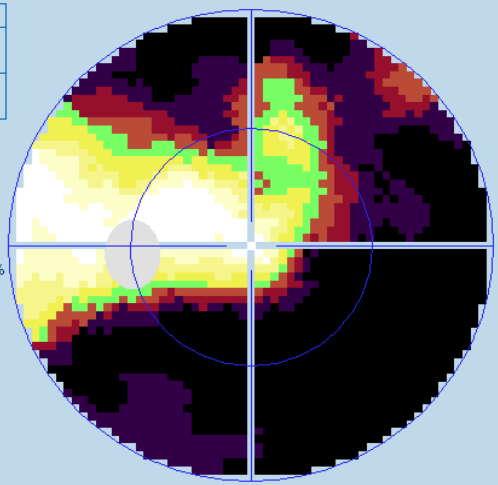


40 årig patient, regnbuesyn i 8 år. Tolket som øjenmigræne…

Patient / Worklist Management | Both eyes

OS 06-03-2014 11:24:42
Greyscale (CO)

30°	
MD 2	MD 1
10,9	18,0
MD 3	MD 4
18,8	25,2

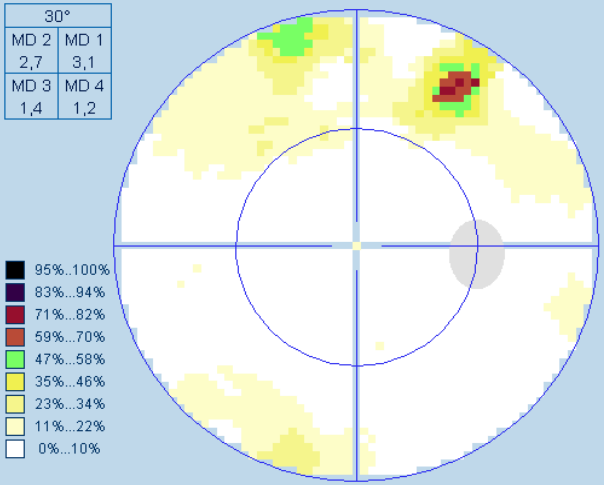


Eye / Pupil [mm]:	Left eye (OS) / 3.9
Test duration:	05:20
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	165 / 1
Catch trials:	0/8 (0%) +, 2/9 (22%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		9,6
MD [dB]	-2..2	18,1
sLV [dB]	0..2.5	9,8
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		11,7

OD 06-03-2014 11:10:00
Greyscale (CO)

30°	
MD 2	MD 1
2,7	3,1
MD 3	MD 4
1,4	1,2



Eye / Pupil [mm]:	Right eye (OD) / 3.9
Test duration:	04:37
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	153 / 1
Catch trials:	0/8 (0%) +, 0/8 (0%) -

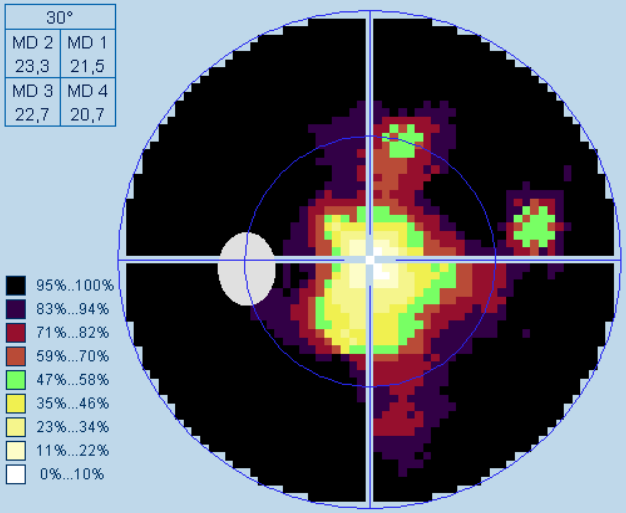
	Normal	Indices
Test locations		59 / 0
MS [dB]		25,6
MD [dB]	-2..2	2,1
sLV [dB]	0..2.5	3,3
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		0,0

35 årig patient, nyopdaget kronisk vinkellukning

Patient / Worklist Management | Both eyes

OS 24-11-2014 08:23:12
Greyscale (CO)

30°	
MD 2	MD 1
23,3	21,5
MD 3	MD 4
22,7	20,7

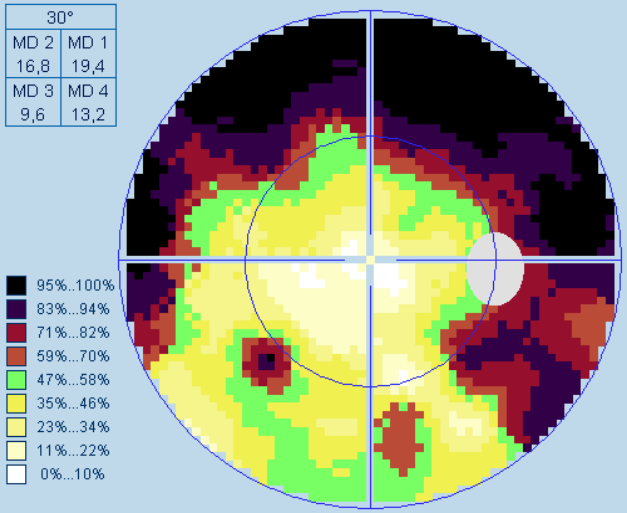


Eye / Pupil [mm]:	Left eye (OS) / 2.8
Test duration:	04:41
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	147 / 0
Catch trials:	0/7 (0%) +, 2/8 (25%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		6,3
MD [dB]	-2..2	21,7
sLV [dB]	0..2.5	7,7
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		13,3

OD 24-11-2014 08:13:51
Greyscale (CO)

30°	
MD 2	MD 1
16,8	19,4
MD 3	MD 4
9,6	13,2



Eye / Pupil [mm]:	Right eye (OD) / 2.6
Test duration:	05:45
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	161 / 1
Catch trials:	0/8 (0%) +, 2/8 (25%) -

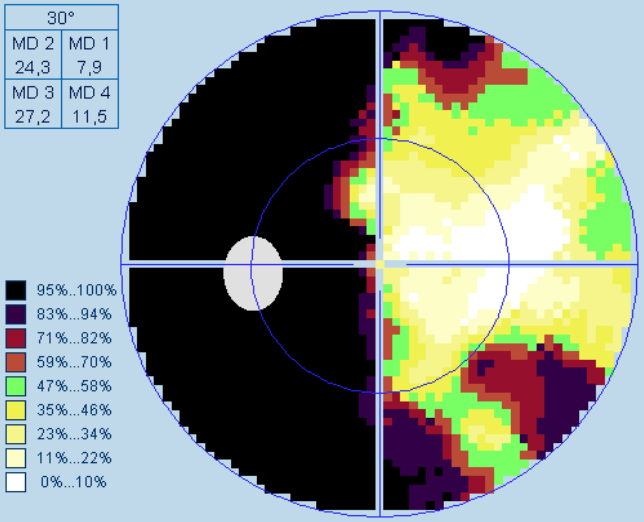
	Normal	Indices
Test locations		59 / 0
MS [dB]		13,4
MD [dB]	-2..2	14,5
sLV [dB]	0..2.5	8,2
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		12,5

60 årig mand med lidt ”synsbesvær”. Glaukom?

Patient / Worklist Management | Both eyes

OS 08-04-2014 10:17:00
Greyscale (CO)

30°	
MD 2 24,3	MD 1 7,9
MD 3 27,2	MD 4 11,5

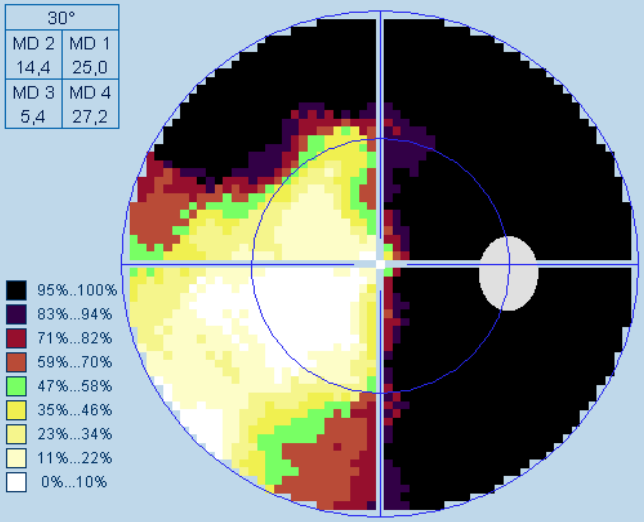


Eye / Pupil [mm]:	Left eye (OS) / 4.2
Test duration:	03:55
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	125 / 0
Catch trials:	0/6 (0%) +, 1/6 (17%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		9,3
MD [dB]	-2..2	17,3
sLV [dB]	0..2.5	9,9
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		8,3

OD 08-04-2014 09:54:11
Greyscale (CO)

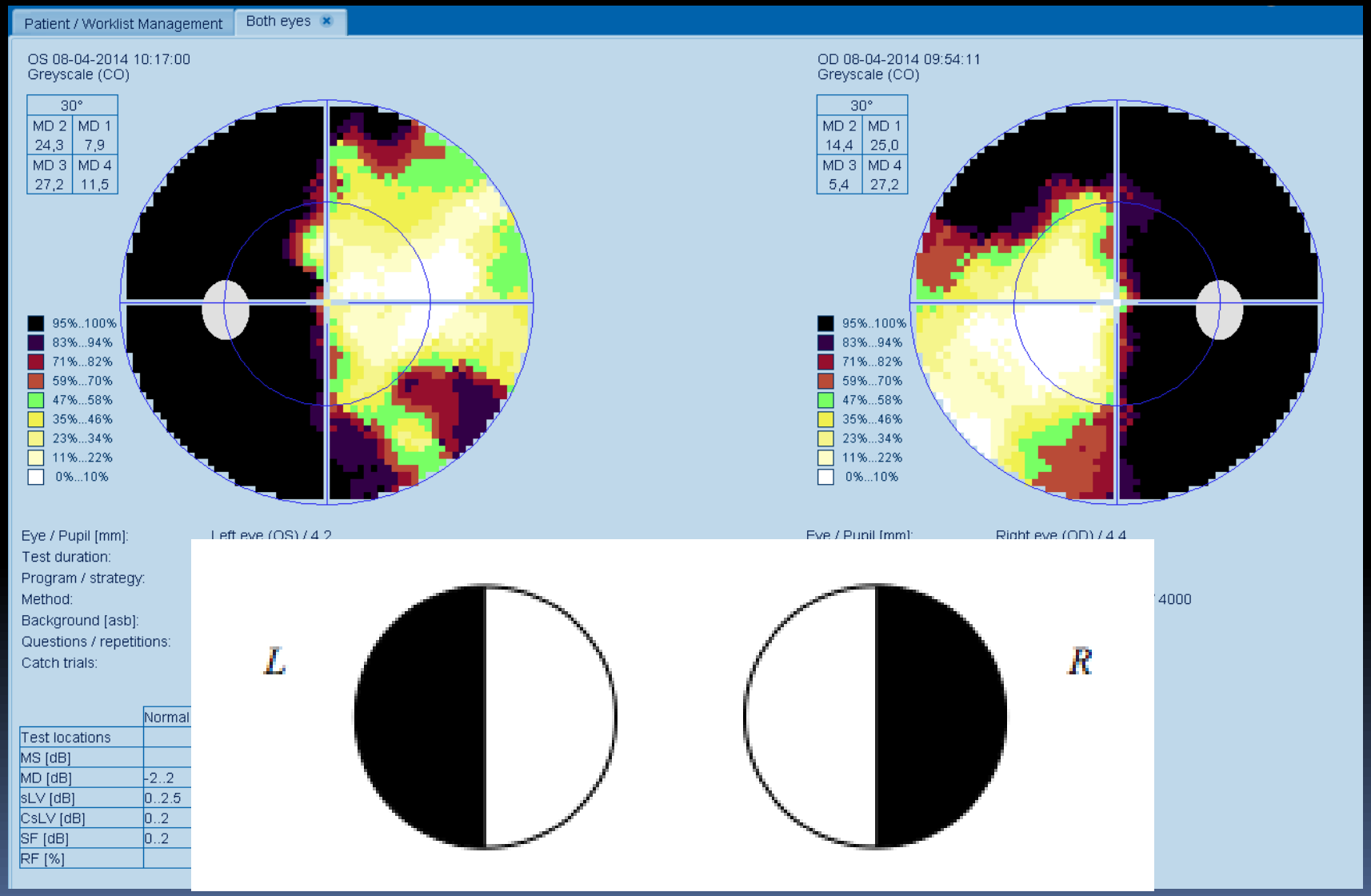
30°	
MD 2 14,4	MD 1 25,0
MD 3 5,4	MD 4 27,2

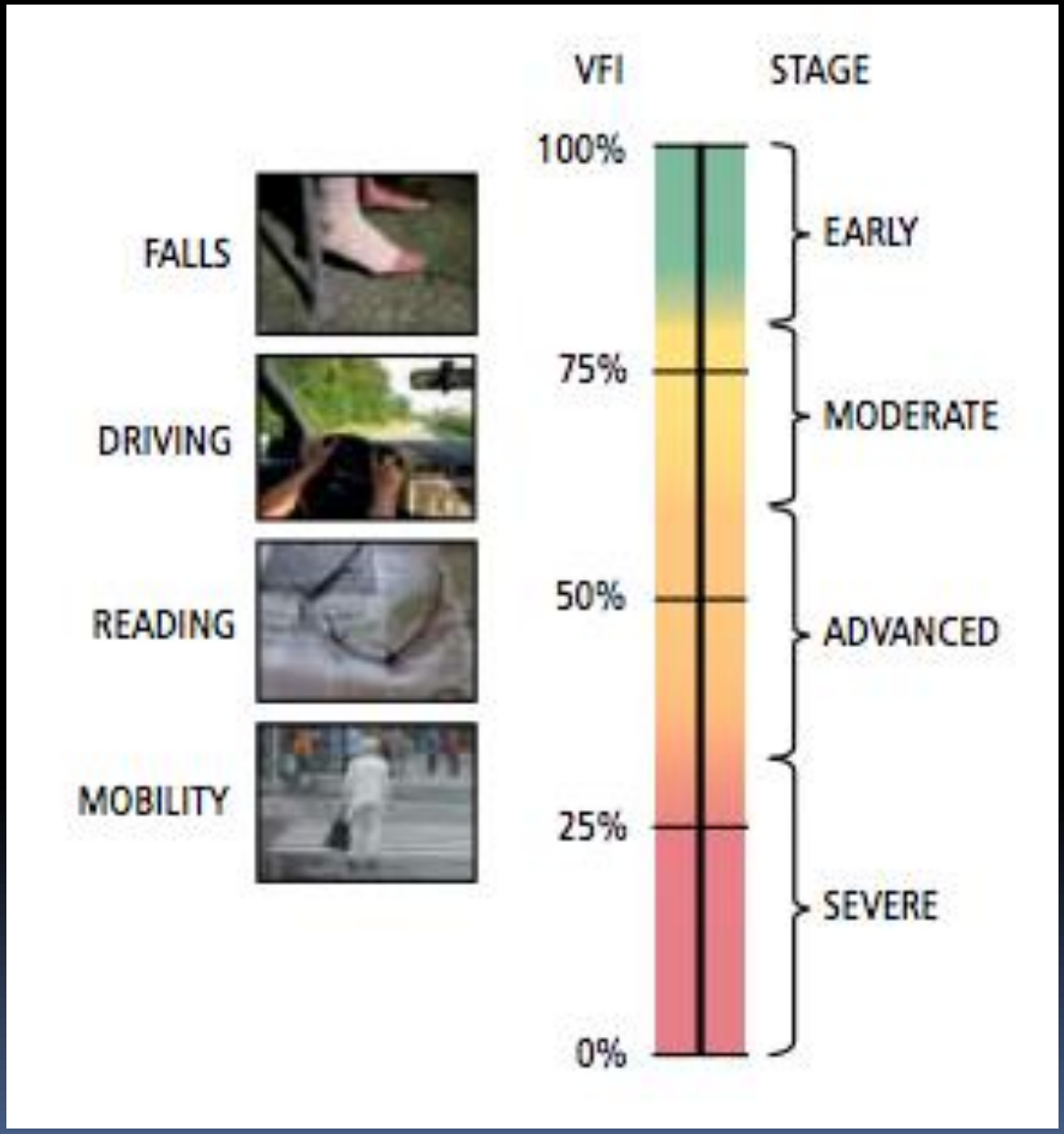


Eye / Pupil [mm]:	Right eye (OD) / 4.4
Test duration:	04:35
Program / strategy:	G / Dynamic
Method:	Standard / White/White / 4000
Background [asb]:	31.4
Questions / repetitions:	137 / 0
Catch trials:	0/7 (0%) +, 0/7 (0%) -

	Normal	Indices
Test locations		59 / 0
MS [dB]		9,2
MD [dB]	-2..2	17,4
sLV [dB]	0..2.5	10,3
CsLV [dB]	0..2	
SF [dB]	0..2	
RF [%]		0,0

Hypofysetumor





MD < 6 dB

MD <12 dB

MD >12 dB

Karen Bjerg Pedersen, afd.læge, PhD, FEBO. Øjenafdelingen Glostrup Hospital

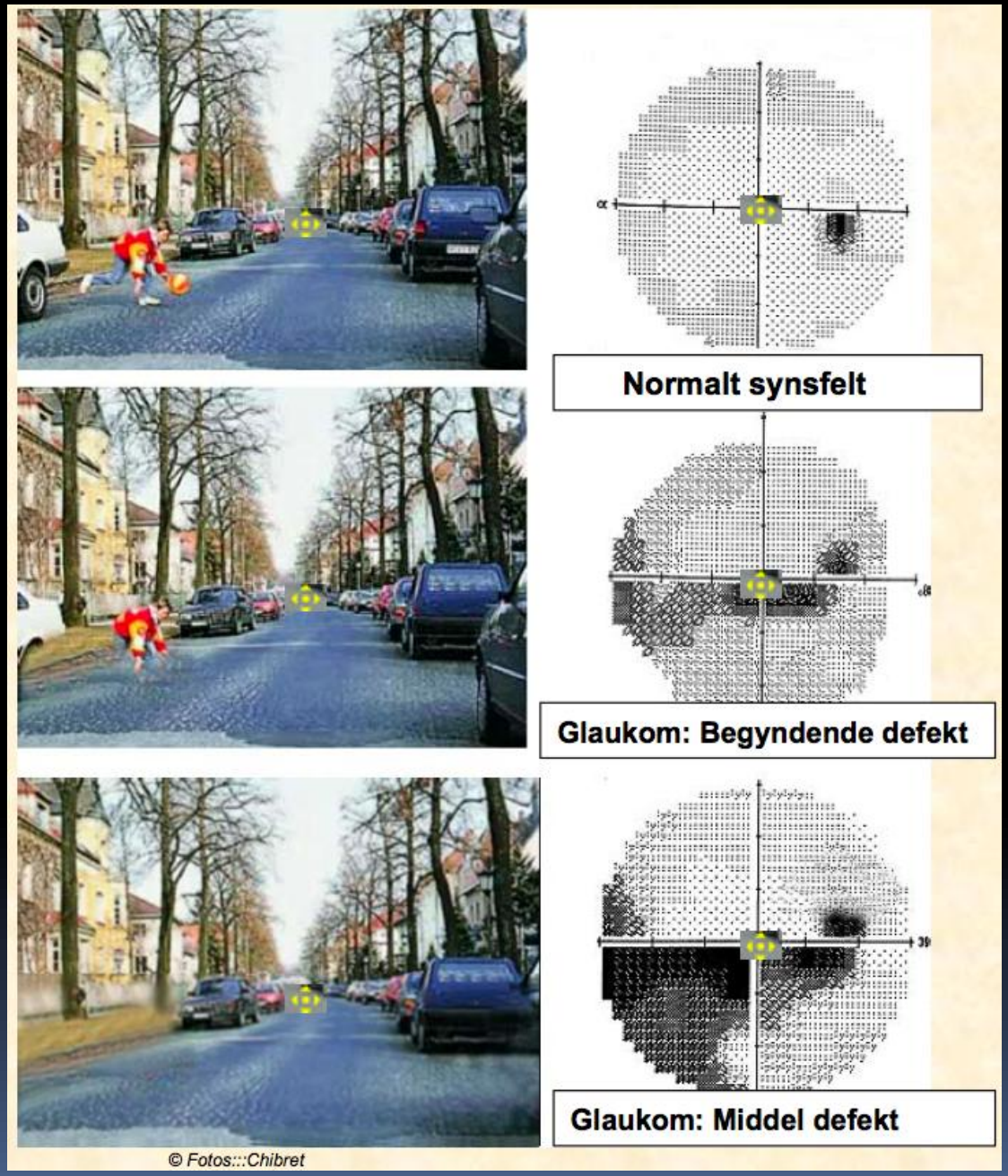
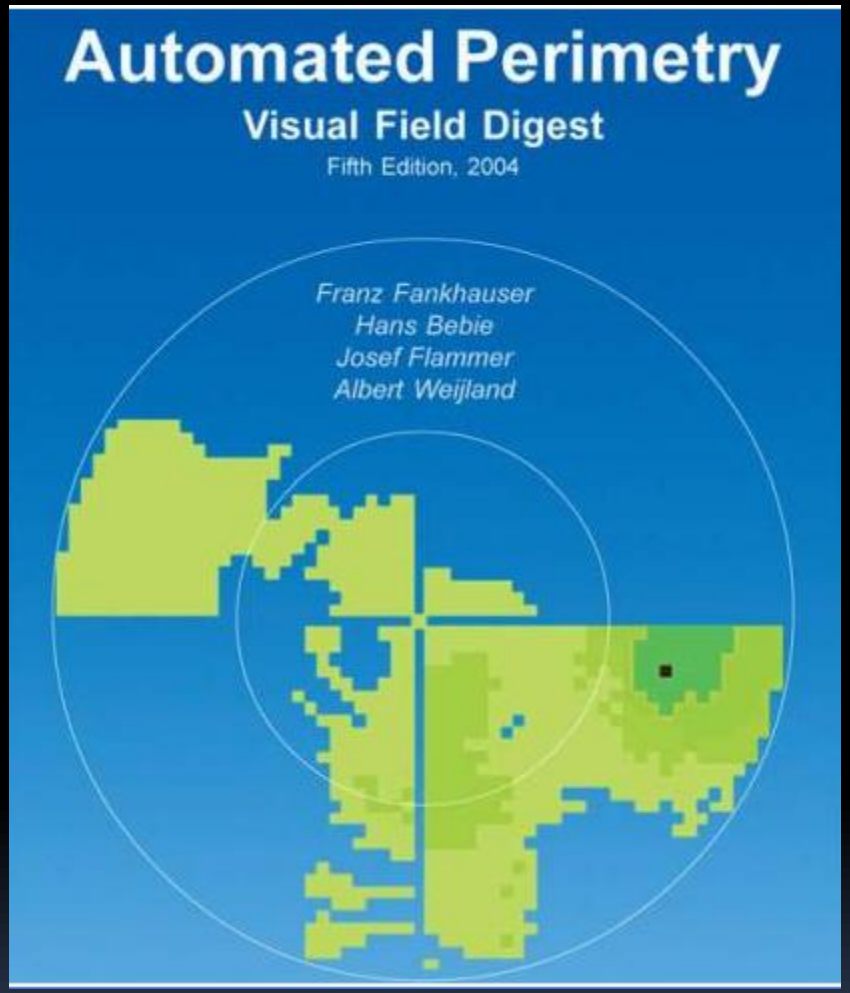
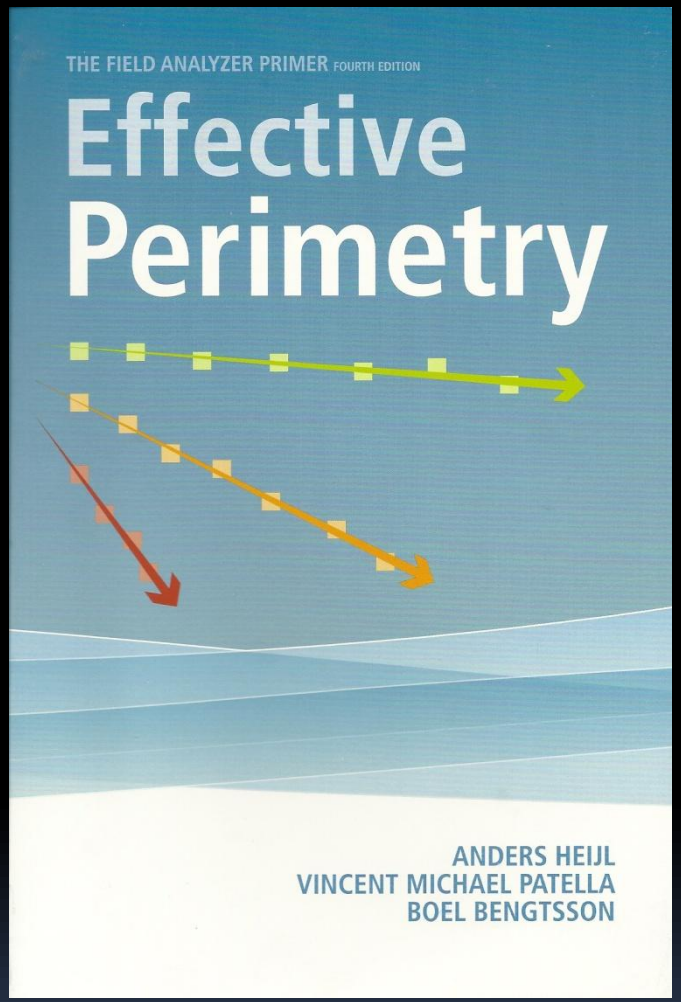


Image courtesy John Thygesen

Karen Bjerg Pedersen, afd.læge, PhD, FEBO. Øjenafdelingen Glostrup Hospital





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