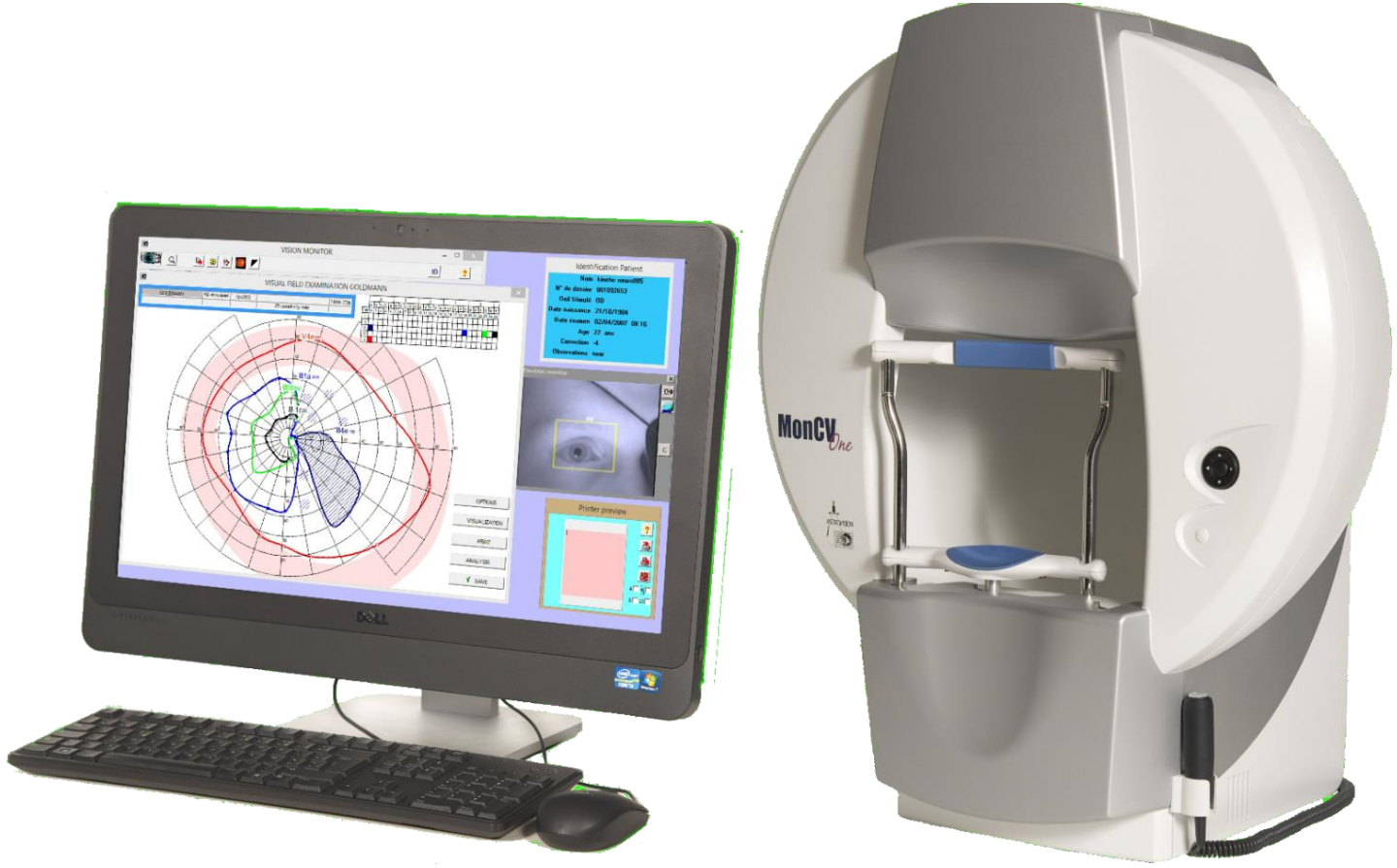


MonCvONE-CR

Multifunction perimeter

Jacques.charlier@metrovision.com

METROVISION

Time line of perimetry

Early developments
discovery of semiology

Landolt
Paris ~1900

Standardization
of stimulation

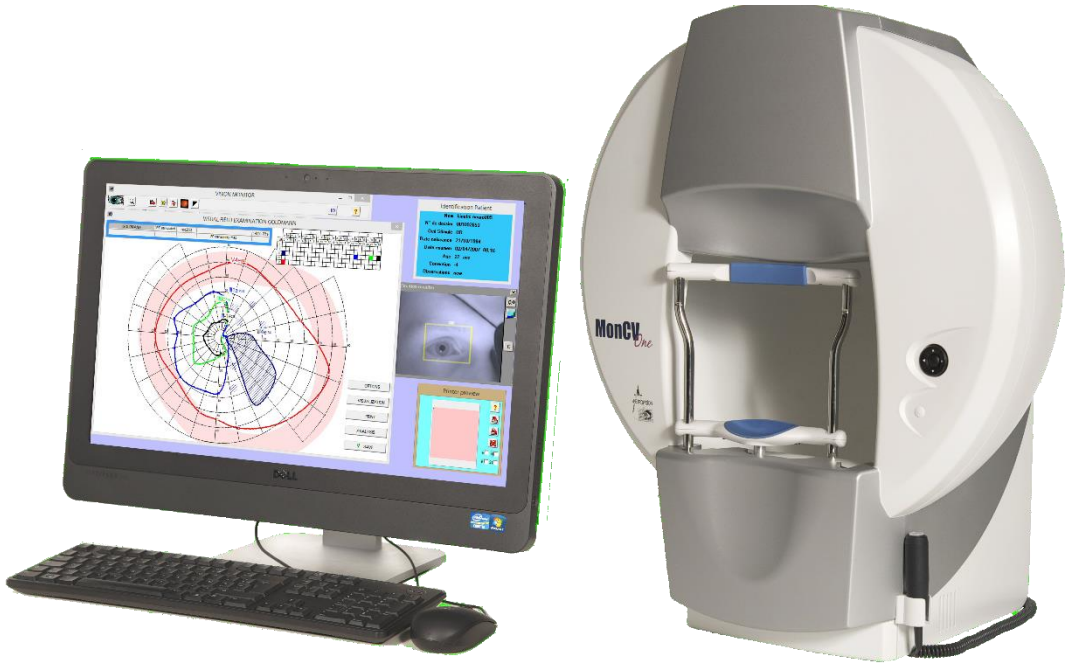
Goldmann,
Bern ~1940

Automation

?

METROVISION

MonCvONE perimeter



- ❖ projection
- ❖ Unique LED source for stimulus
- ❖ LED controlled background illumination

- ❖ 4 versions

SAP Standard Automated Perimetry
PRO Interactive Goldmann and imaging
CR Clinical Research
CR++ Clinical Research with ERG

SAP Standard Automated Perimetry

PRO Interactive Goldmann and video imaging

CR Clinical Research

CR++ Clinical Research with ERG

MonCvONE-SAP

Standard Automated Perimetry

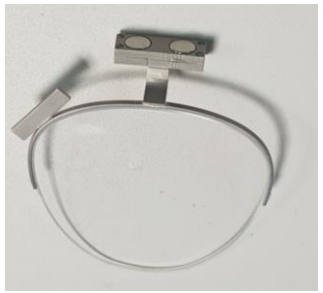
Elimination of the lens rim artefact

MonCvONE-SAP

Magnet technology

Elimination of the lens rim artefact

MonCvONE-SAP



Magnet technology

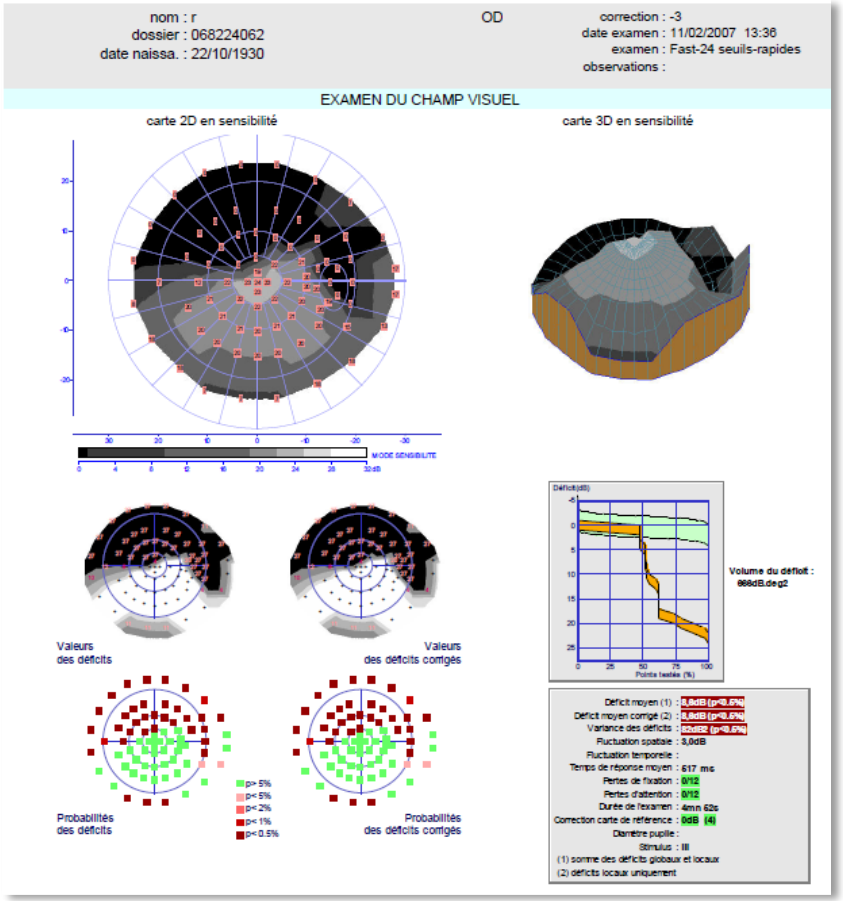
	Metal rim trial lens	Vision Monitor
Useful diameter (mm)	34	55
Maximum eccentricity (degrees) (*)	22.6	36.7

(*) Vertex distance = 13 mm
Decentration = 5 mm

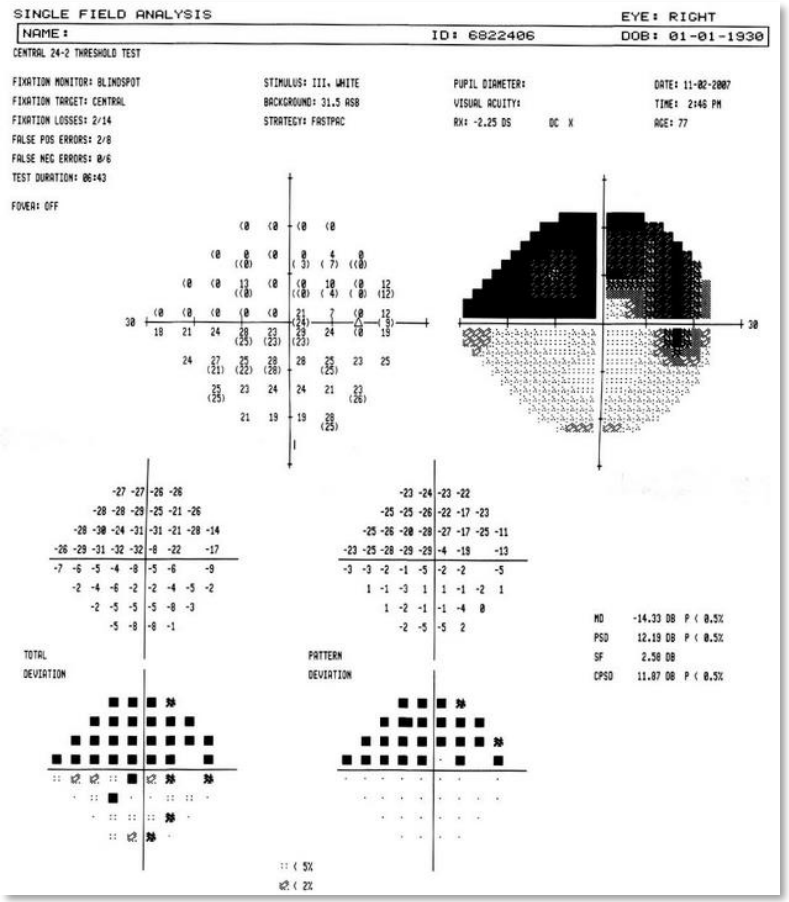
Standard Automated perimetry

MonCvONE-SAP

MonCvONE



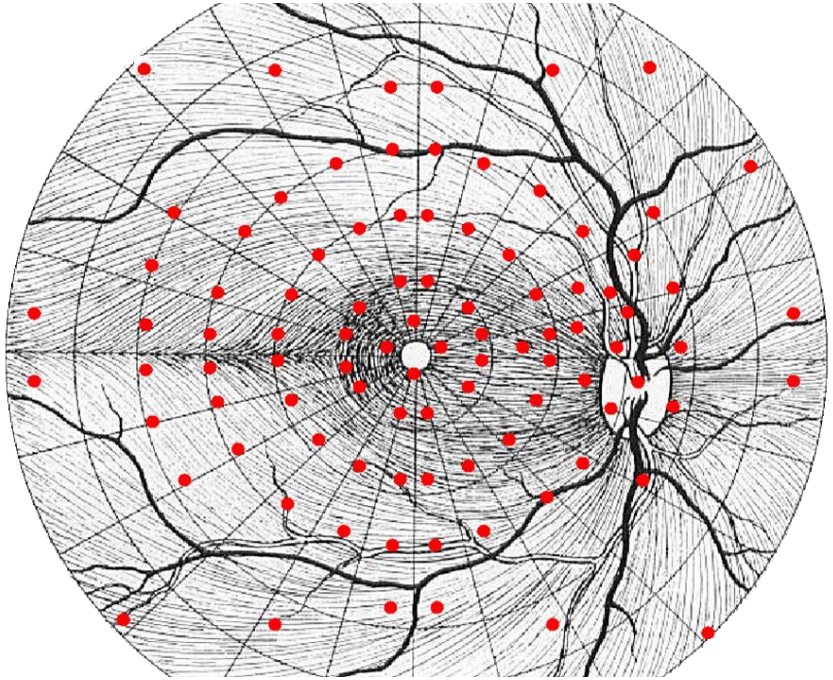
HFA3



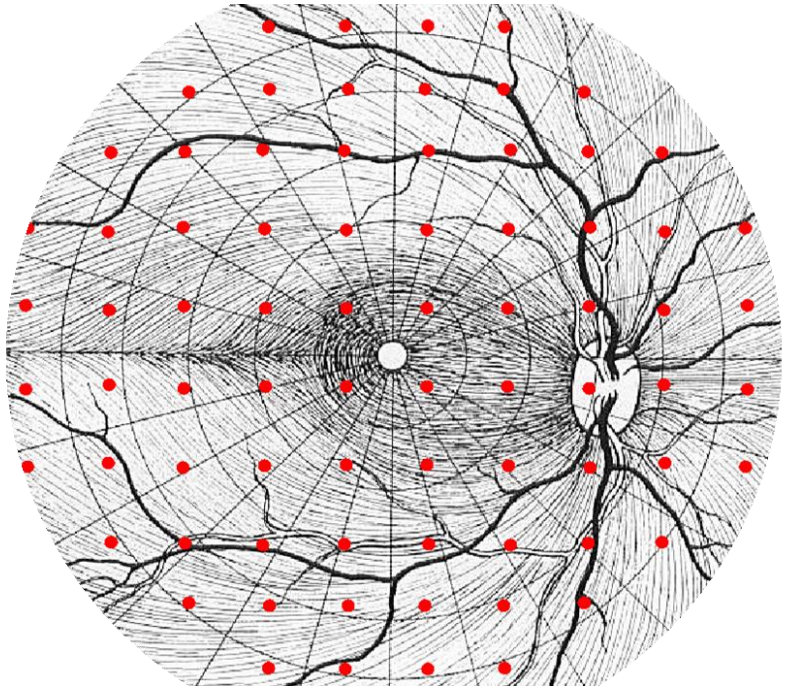
Standard Automated perimetry

MonCvONE-SAP

FAST30: an optimized arrangement of test points



FAST 30

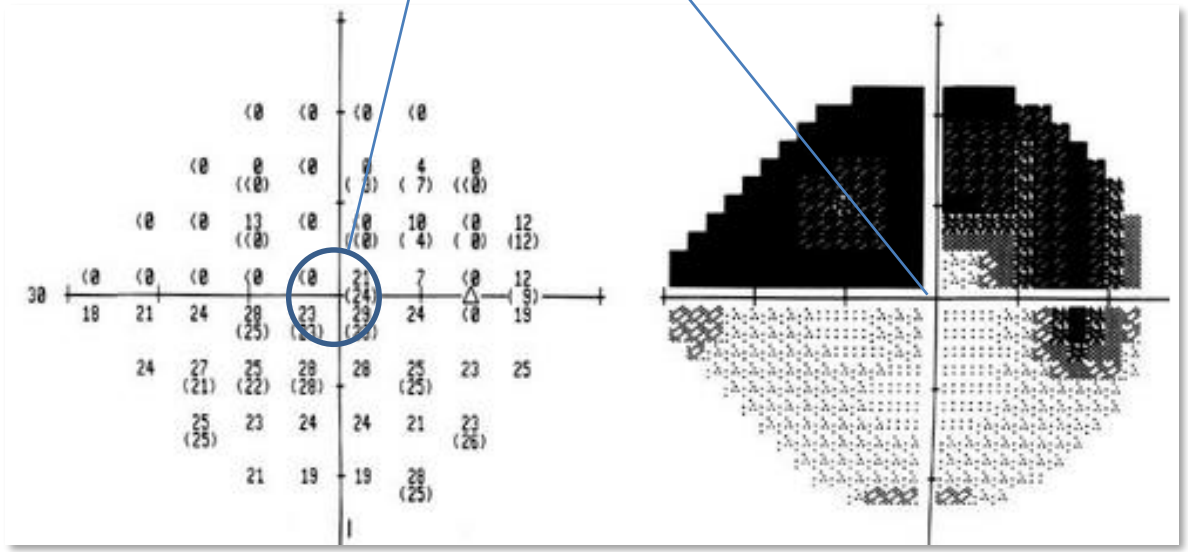


Standard 30/2

Standard Automated perimetry

MonCvONE-SAP

Problems with 30/2 and 24/2 standards



References

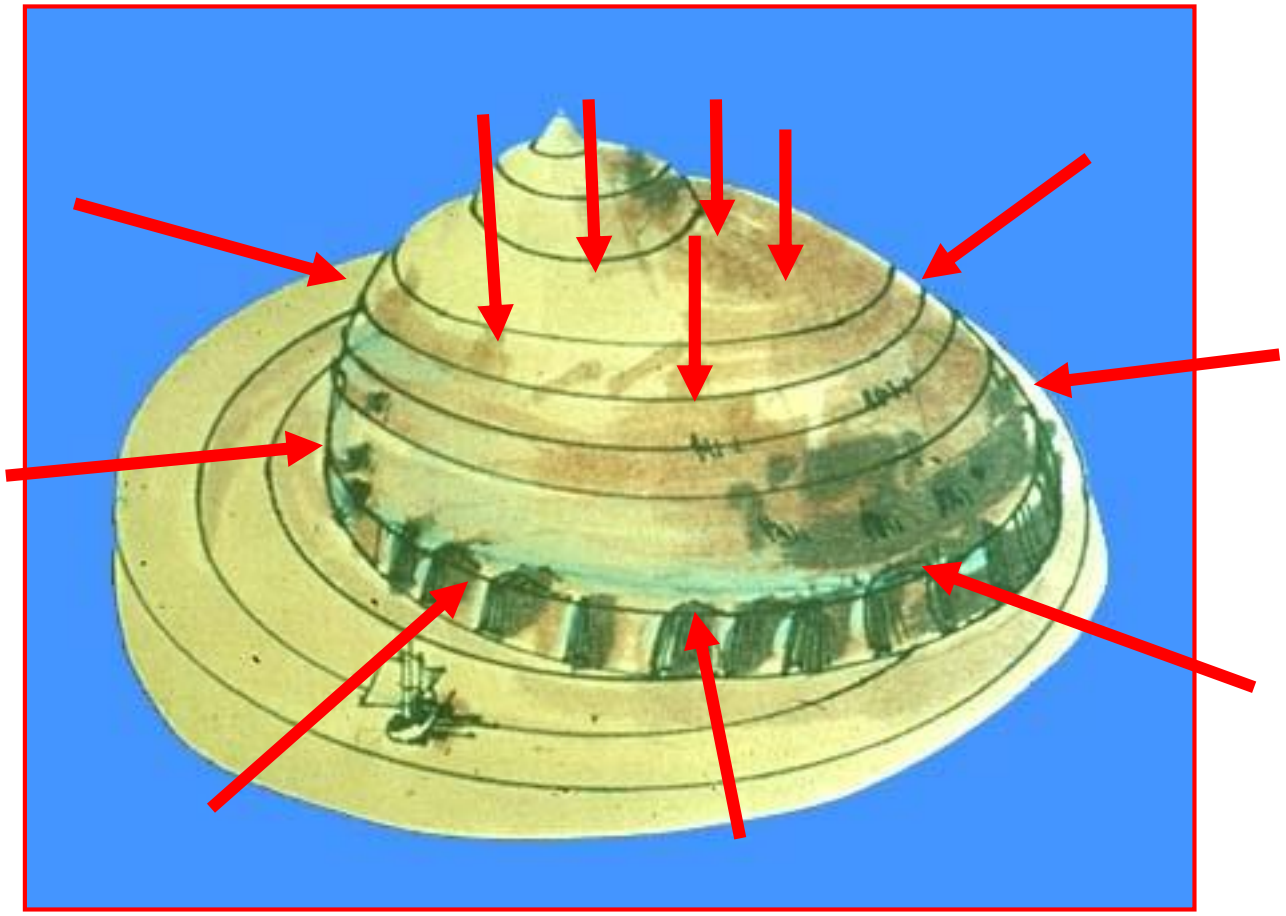
- WEBER & al, Ophthalmologica, 1986
- WESTCOTT & al, BJO, 2002
- SCHIEFER & al, Archives, 2003
- NEVALAINEN & al, Graefes, 2009
- PARK & al, Ophthalmology, 2013
- HANGAI & al, JJO, 2013
- TRAYNIS & al, JAMA, 2014
- CHEN & al, ARVO, 2015
- NOMOTO & al, ARVO, 2016

TRAYNIS: in glaucoma
16% fields with central deficit
are found normal with 24/2

Mixed perimetry

MonCvONE-SAP

- kinetic for periphery
- static for center



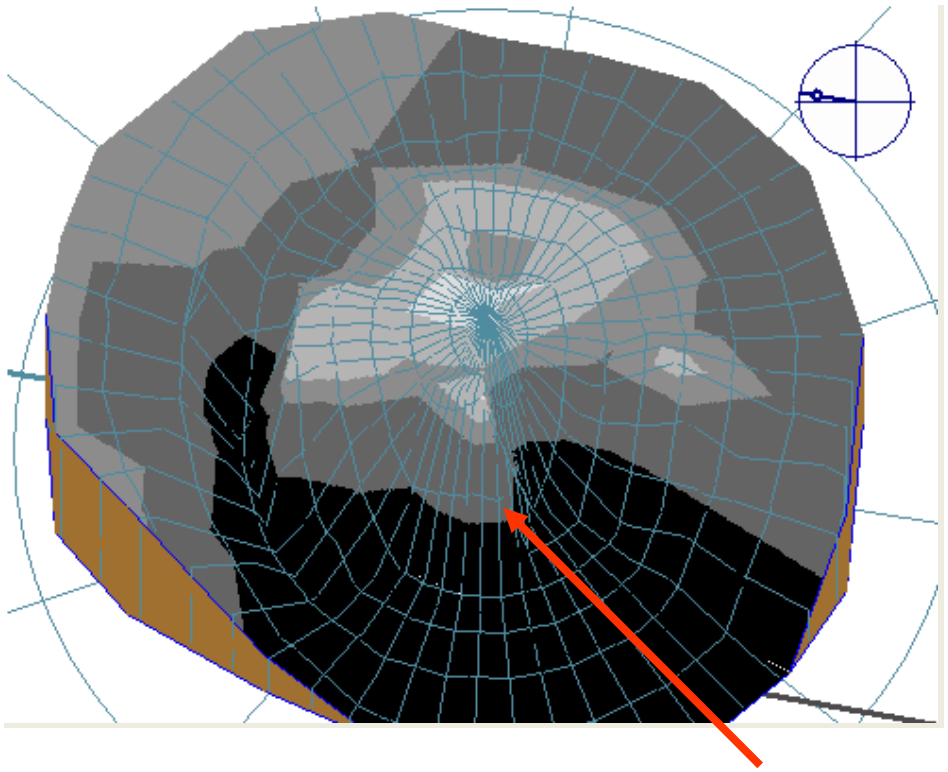
METROVISION

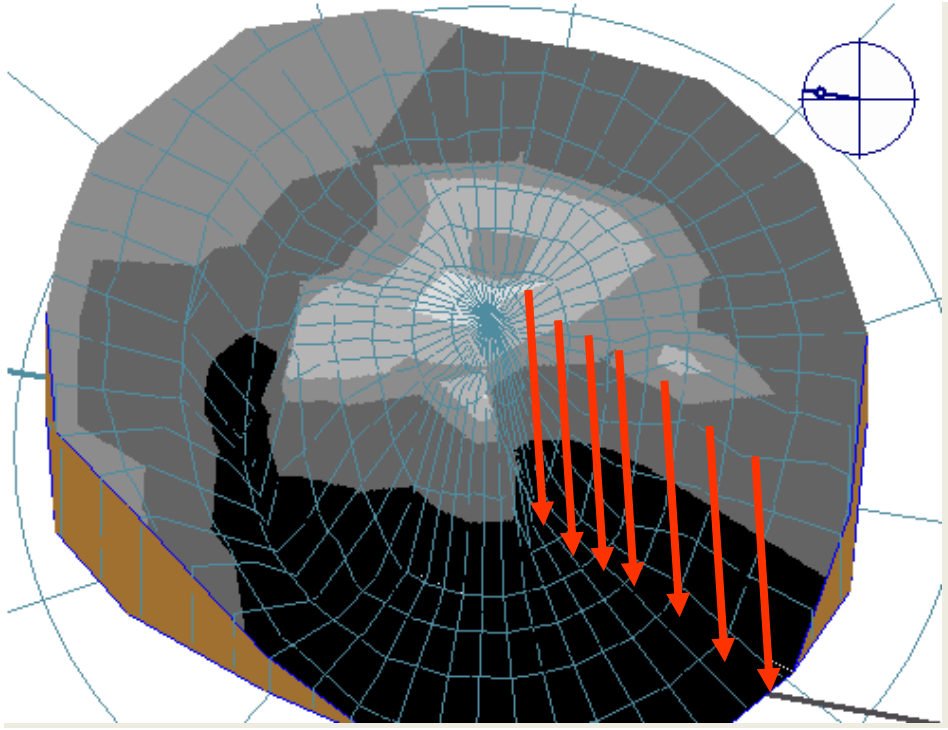
Mixed perimetry on MonCvONE

MonCvONE-SAP

Key points

- ***Reduced testing time for large deficits***
- ***Evaluation of the peripheral extension of deficits***





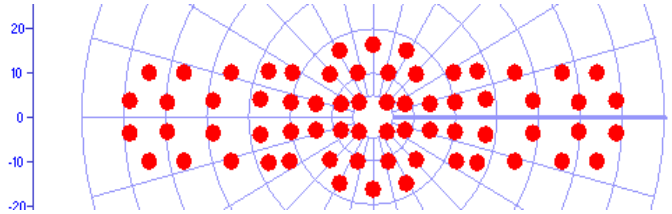
Visual aptitudes

MonCvONE-SAP

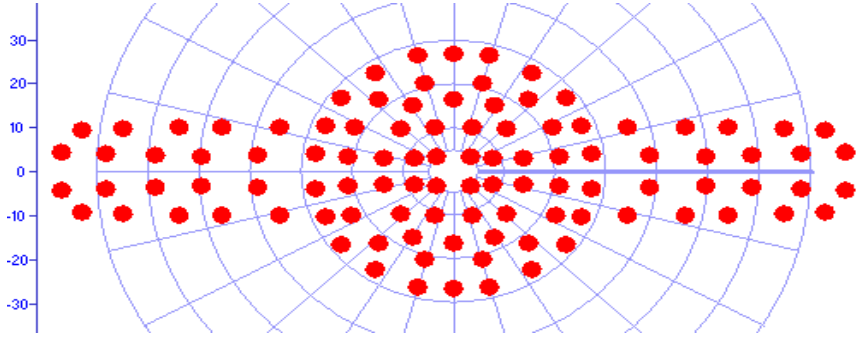
Key points

- ***TRUE BINOCULAR stimulation***
- ***TRUE BINOCULAR control of fixation***

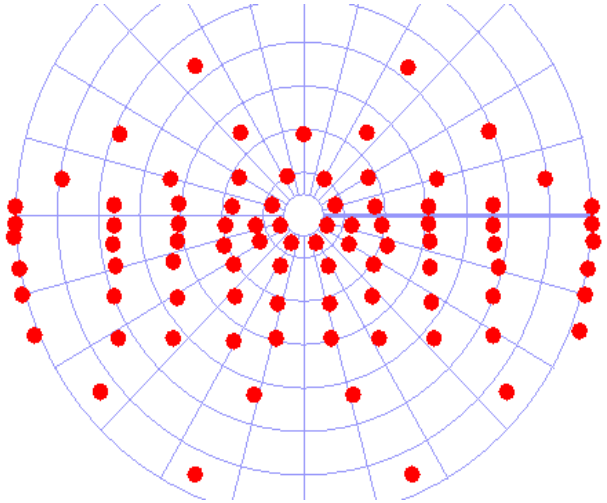
❖ Drivers Group 1



❖ Drivers Group 2



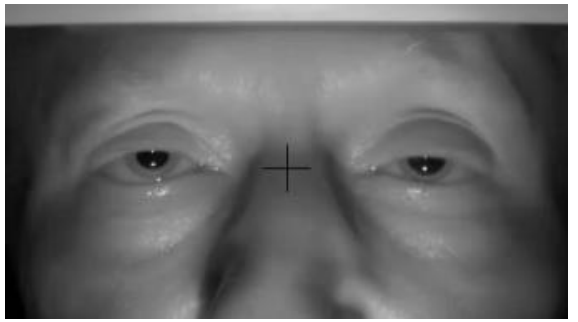
❖ Low vision (Esterman)



METROVISION

TRUE BINOCULAR control of fixation

MonCvONE-SAP



	Standard perimeters	Vision Monitor
Image field width (mm)	28-30	115

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CR Clinical Research
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ARVO BOOTH 1336

MonCvONE-PRO

Interactive Goldmann and Video Imaging

Limits of automated perimetry

MonCvONE-PRO

☞in about 30% of patients
visual fields cannot be realized
or are not reliable

Special needs:

- ❖ Infants
- ❖ Old age
- ❖ Low vision
- ❖ Cognitive handicap

Solutions:

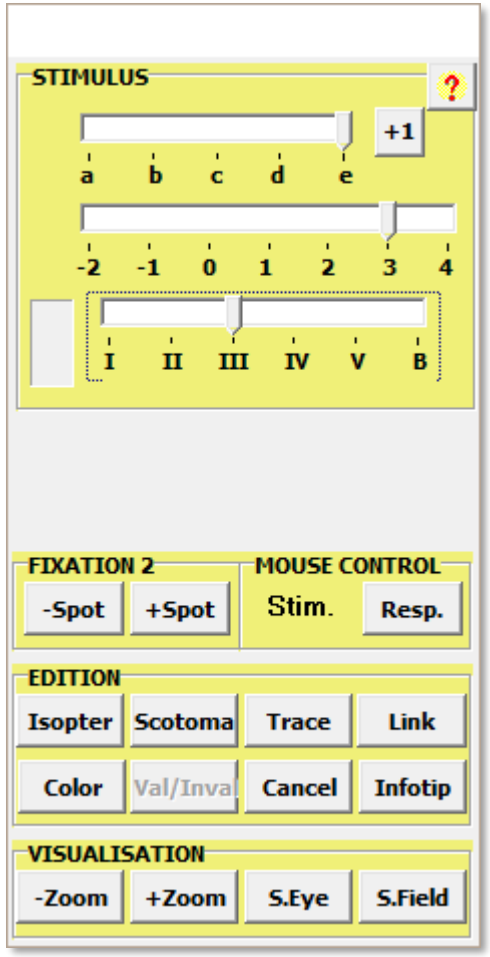
- ❖ Truly interactive interface
- ❖ High resolution video imaging

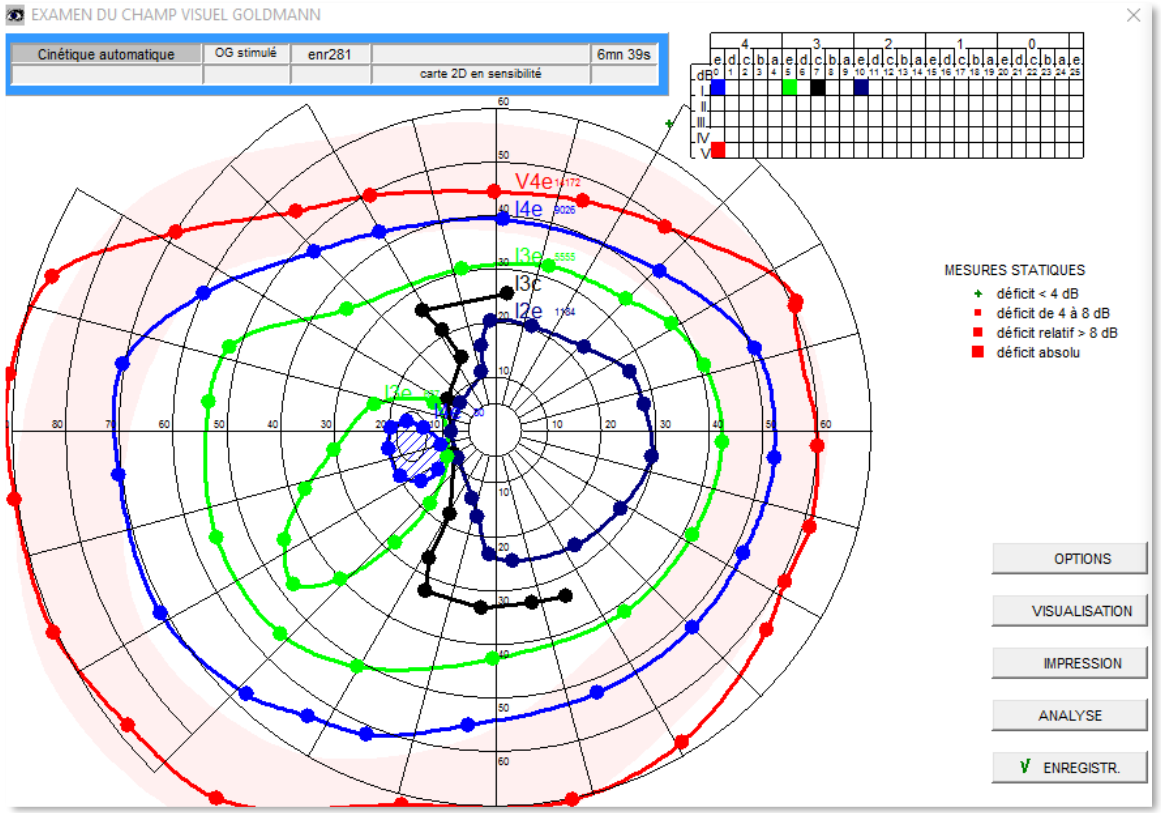
METROVISION

Modern Goldmann perimetry

MonCvONE-PRO

- Selection of parameters similar to Goldmann





MonCvONE - Multifunction perimeter

Modern Goldmann perimetry

MonCvONE-PRO

TRULY interactive interface

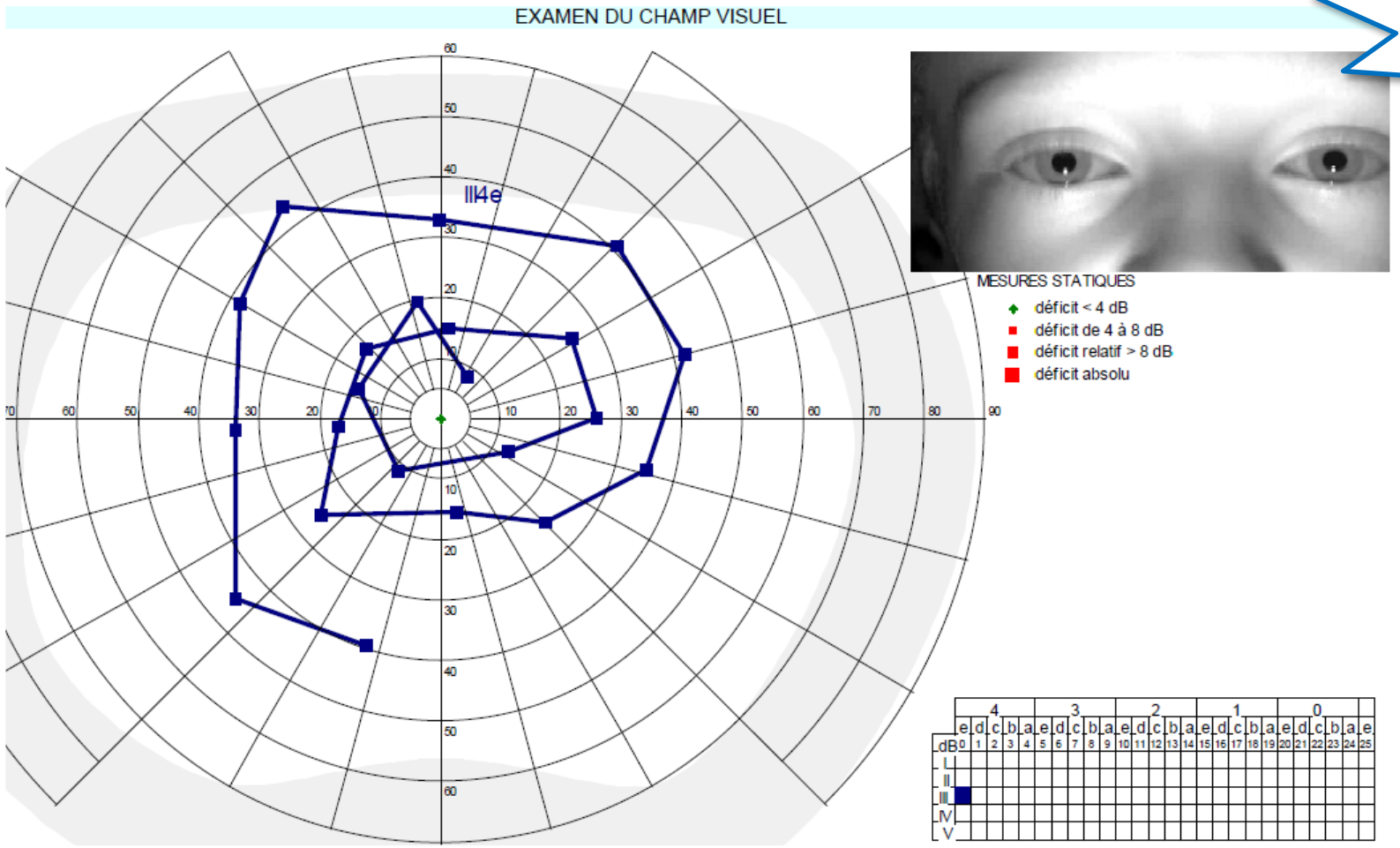
Direct, real time, mouse control of the stimulus

Modern Goldmann perimetry

MonCvONE-PRO

TRULY interactive interface

- 11 years old girl

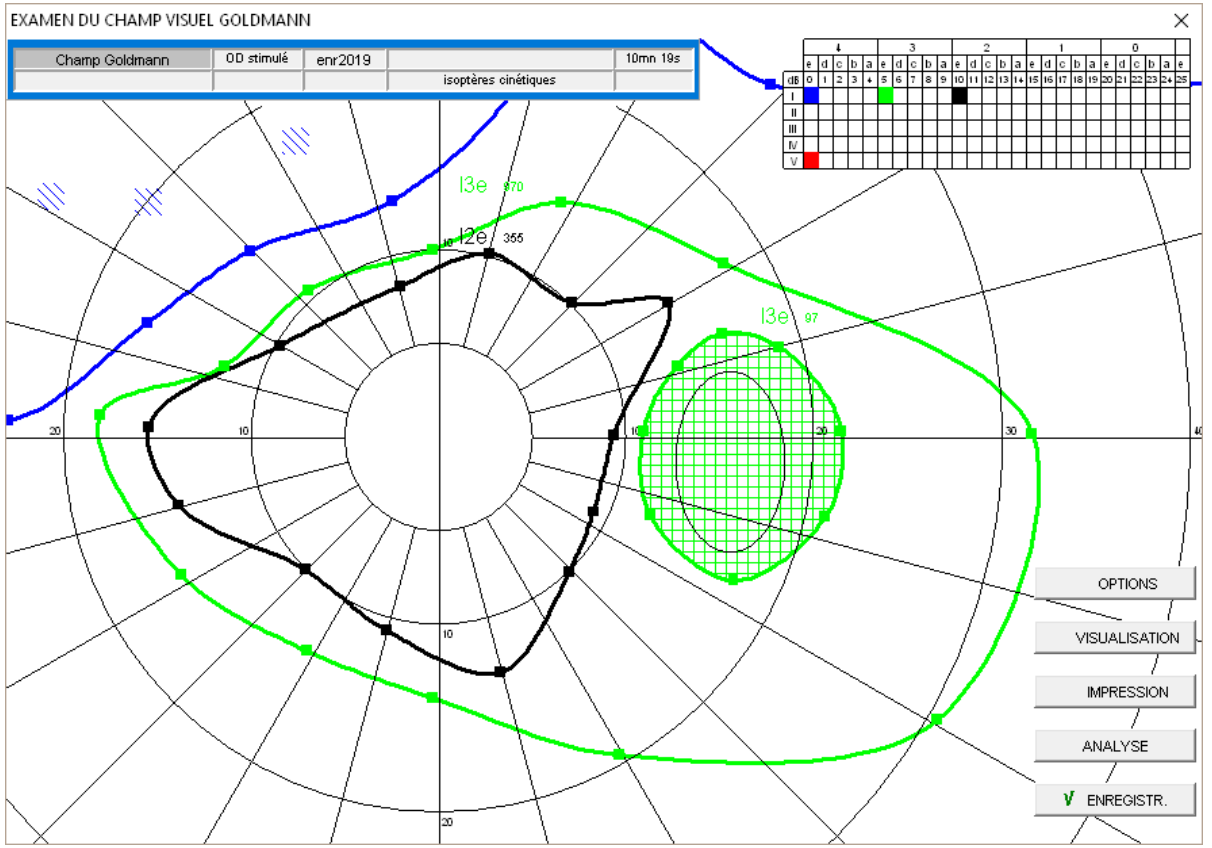


Modern Goldmann perimetry

MonCvONE-PRO

- Zoom in and out

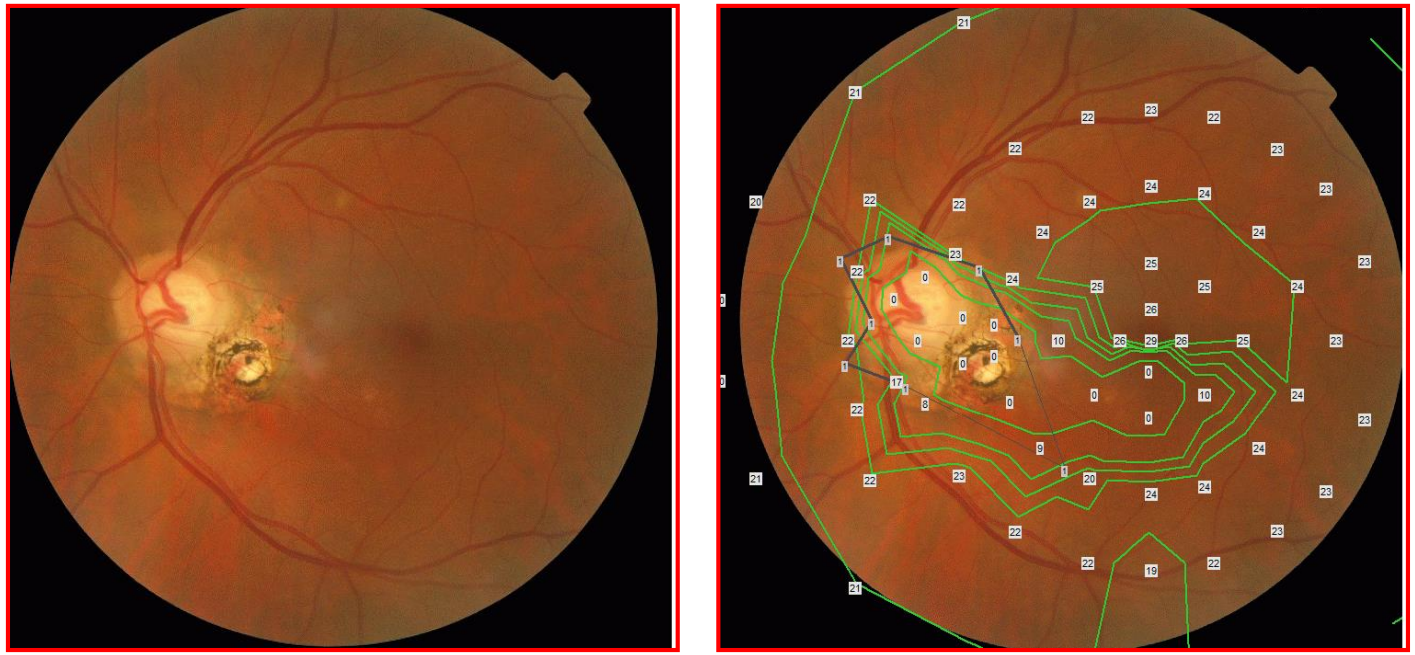
➔ evaluation of macula



Modern Goldmann perimetry

MonCvONE-PRO

- Import of eye fundus image
- Import a previous perimetry exam

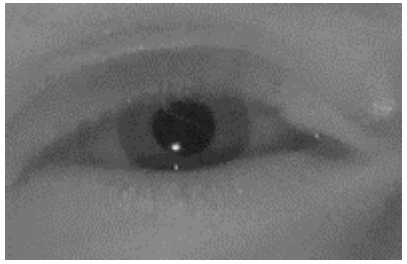


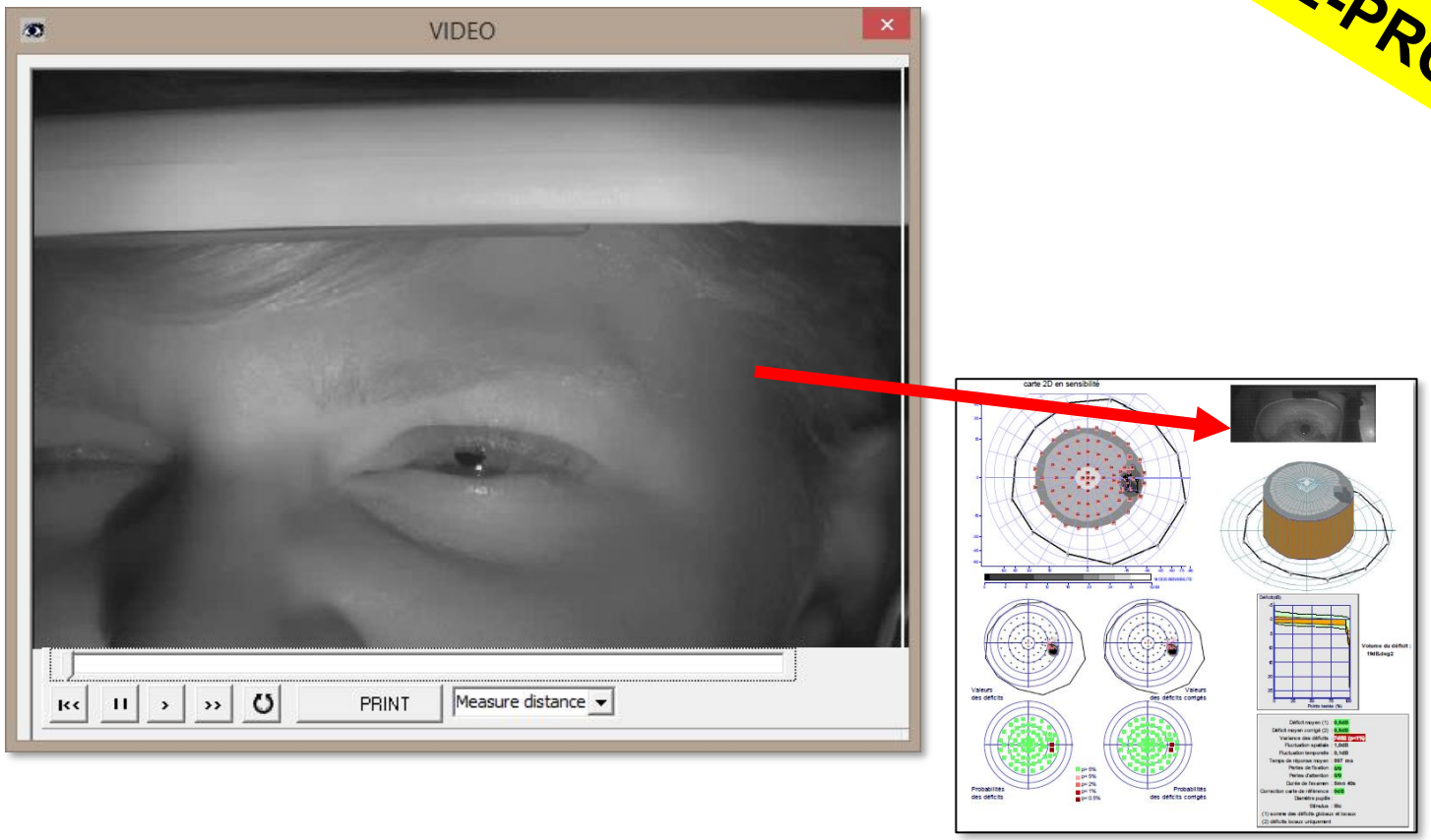
toxoplasmosis

Video imaging

MonCvONE-PRO

- Automated video image processing
- Measure pupil size
- Control fixation
- Record compressed video

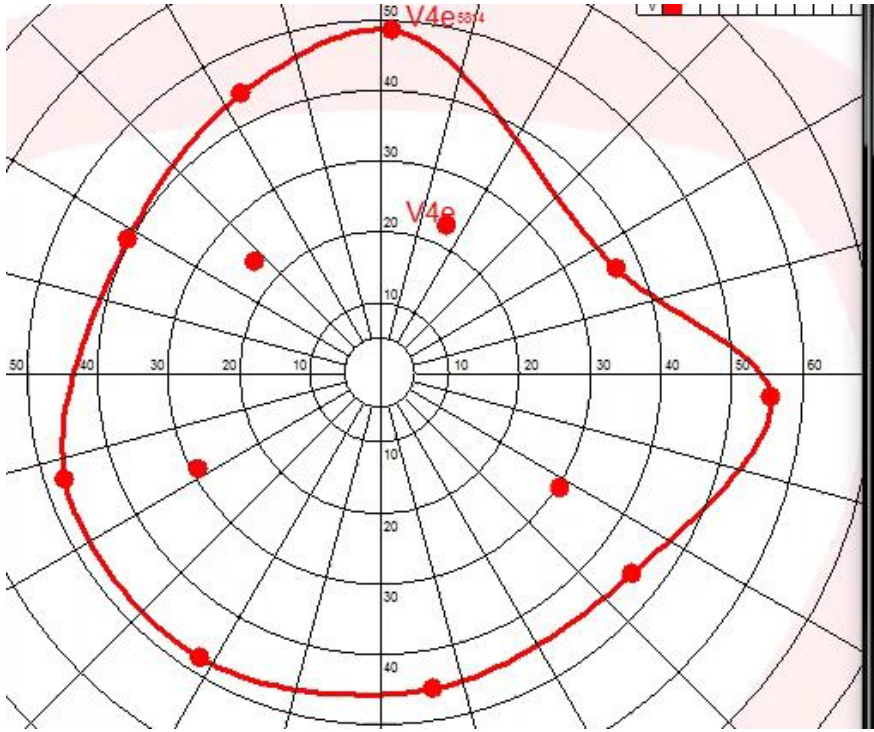


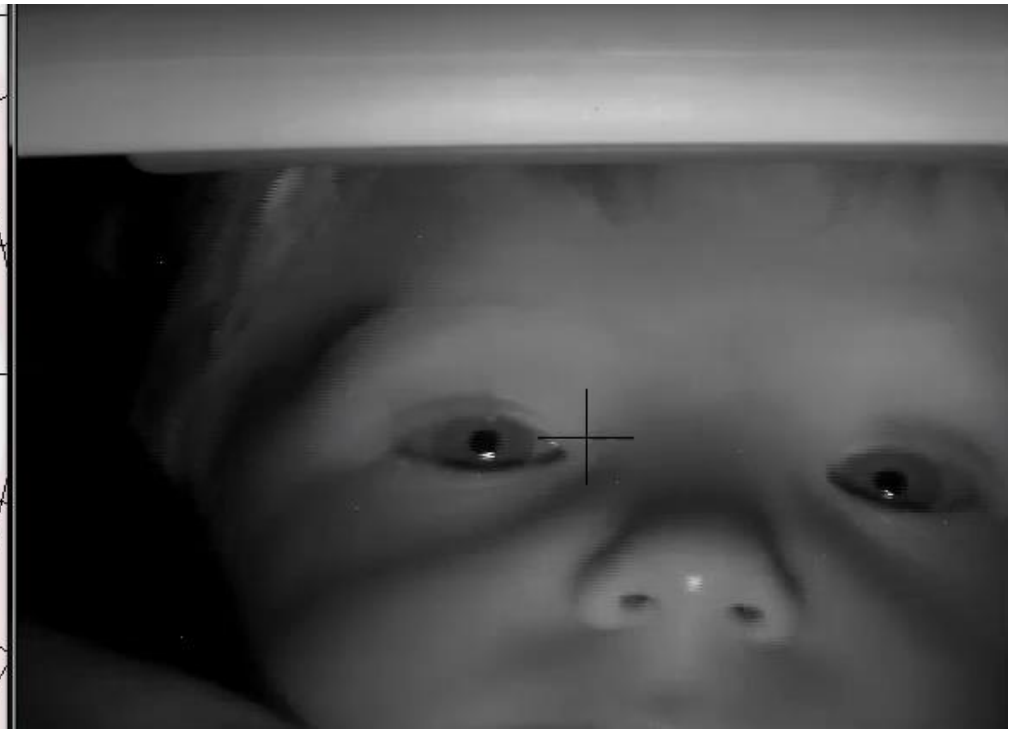


Attraction perimetry for pediatric ophthalmology

MonCvONE-PRO

- Noah, 2 years old
- Hemiparesis, developmental delay



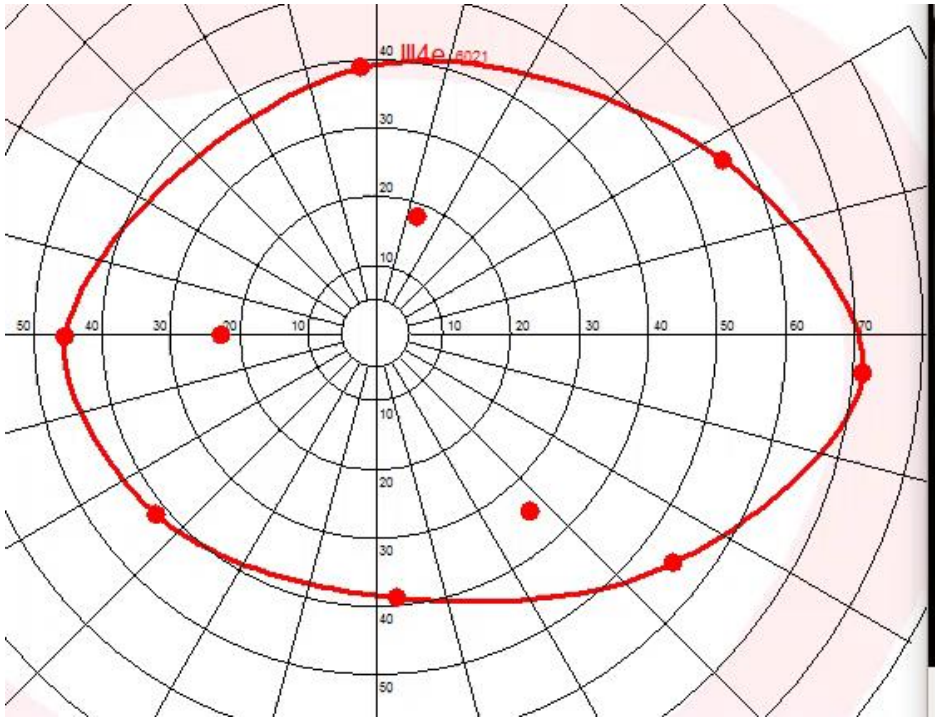


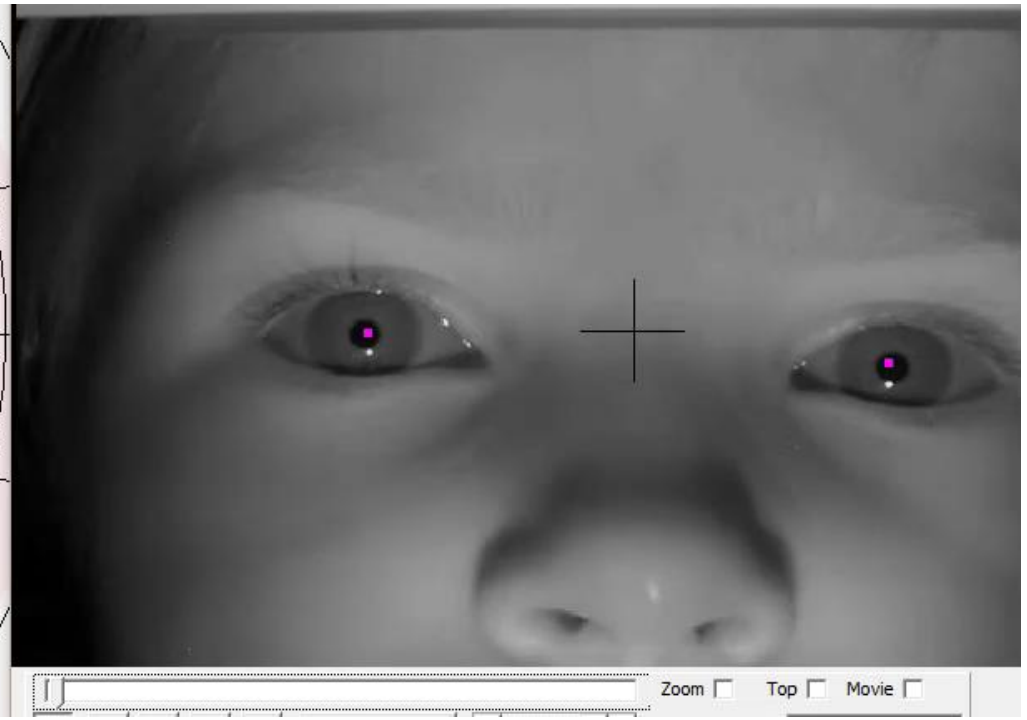
METROVISION

Attraction perimetry for pediatric ophthalmology

MonCvONE-PRO

- Lola, 4 years old





Attraction perimetry for pediatric ophthalmology

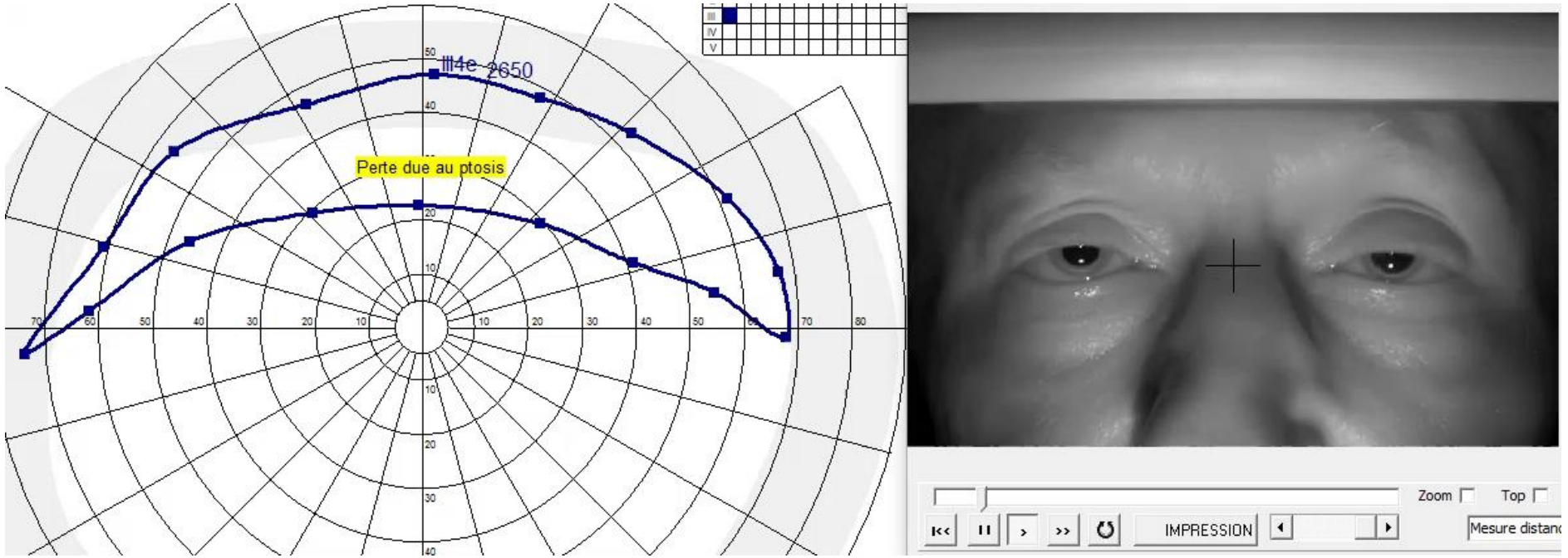
MonCvONE-PRO

METROVISION

Ptosis evaluation

MonCvONE-PRO

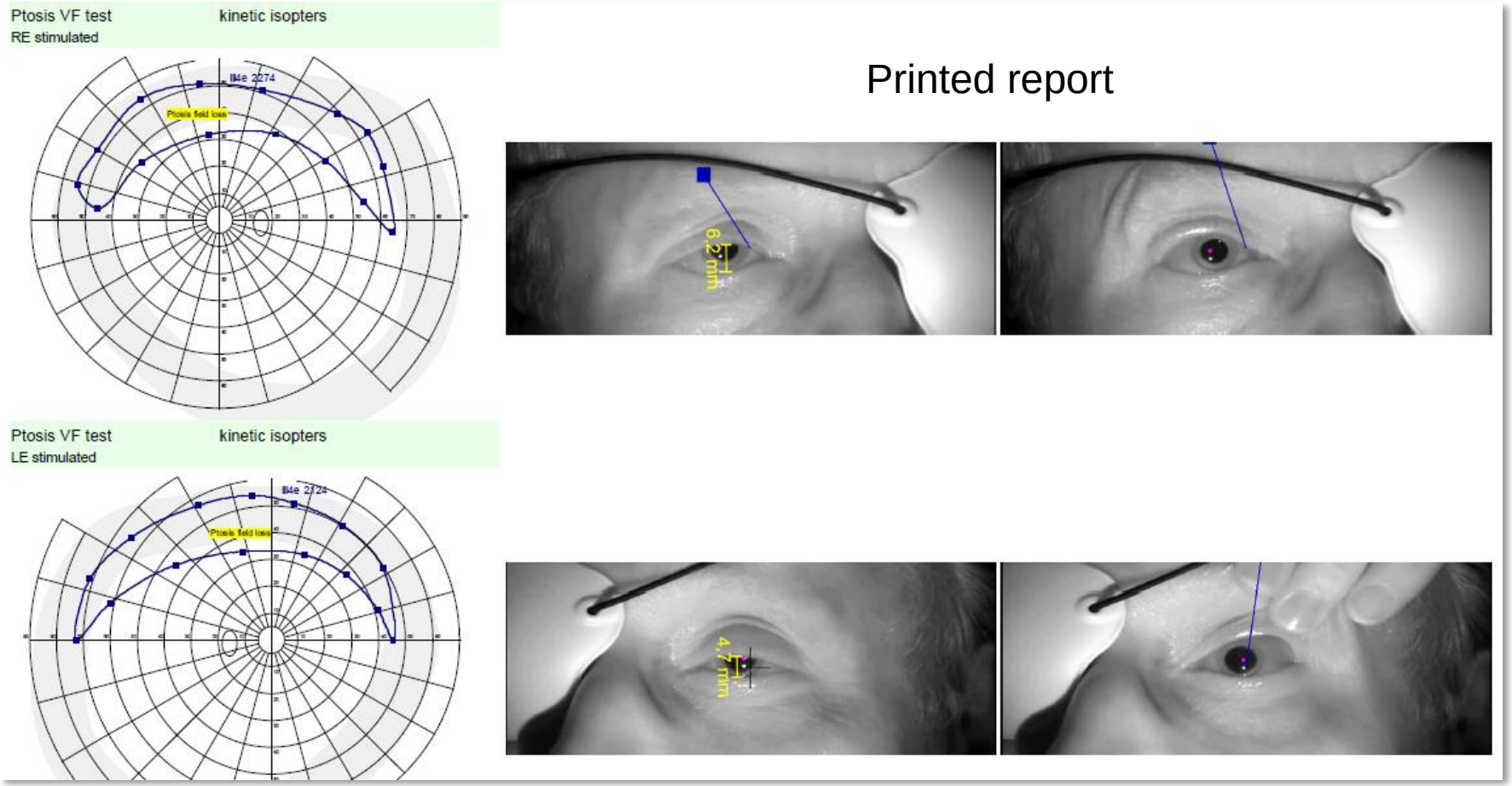
- Replay of exam at high speed



Ptosis evaluation

MonCvONE-PRO

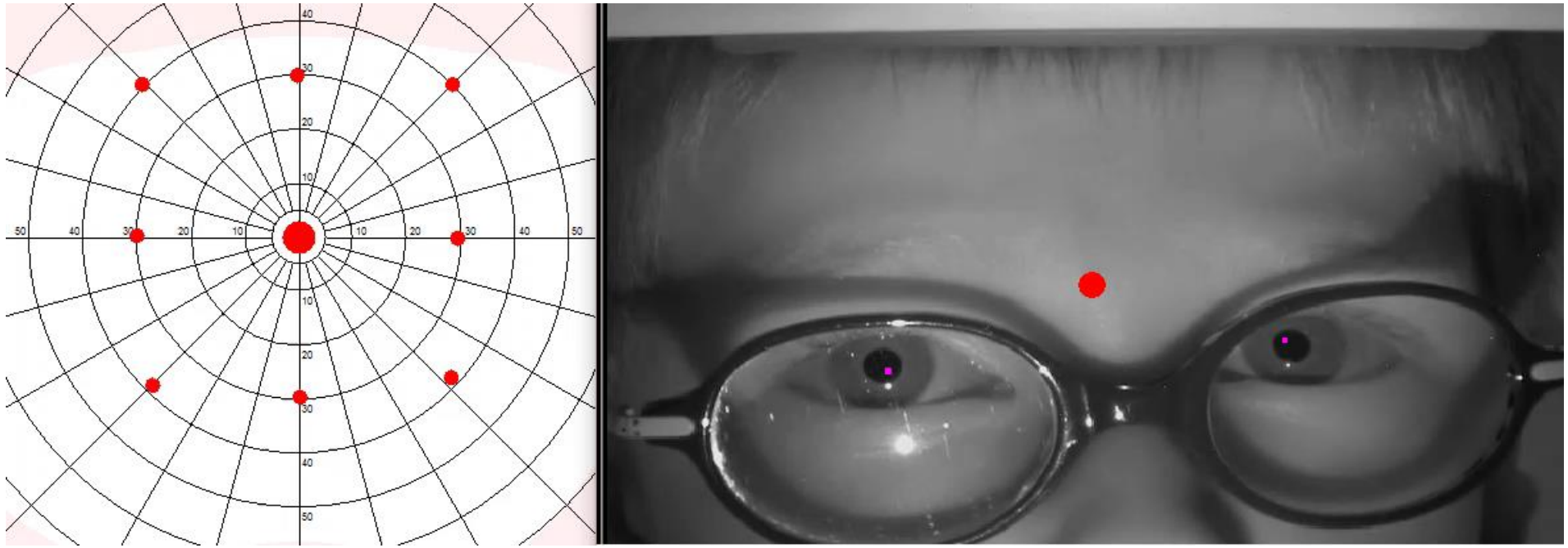
Printed report



METROVISION

Cardinal positions of gaze

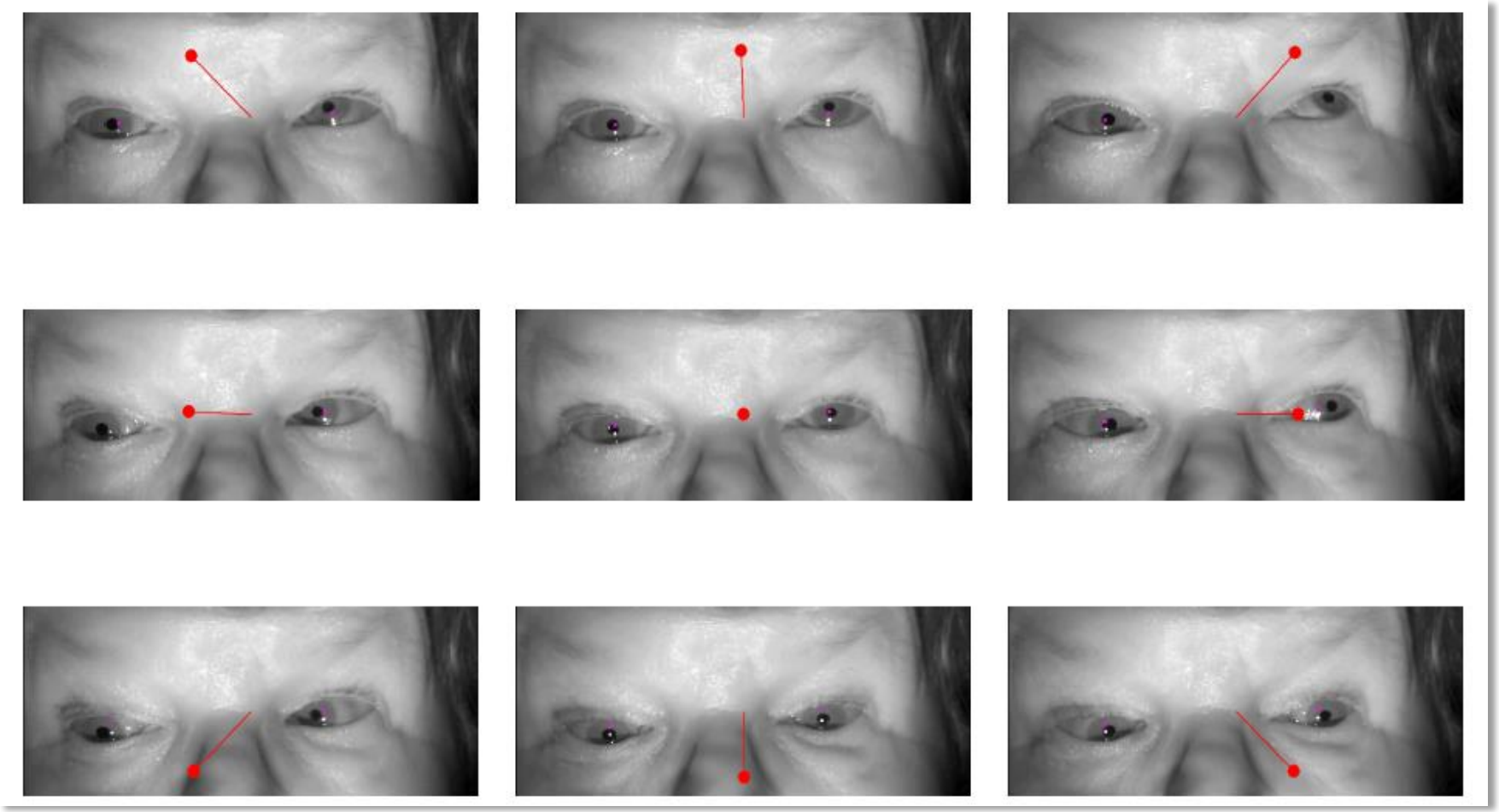
MonCvONE-PRO



METROVISION

Cardinal positions of gaze

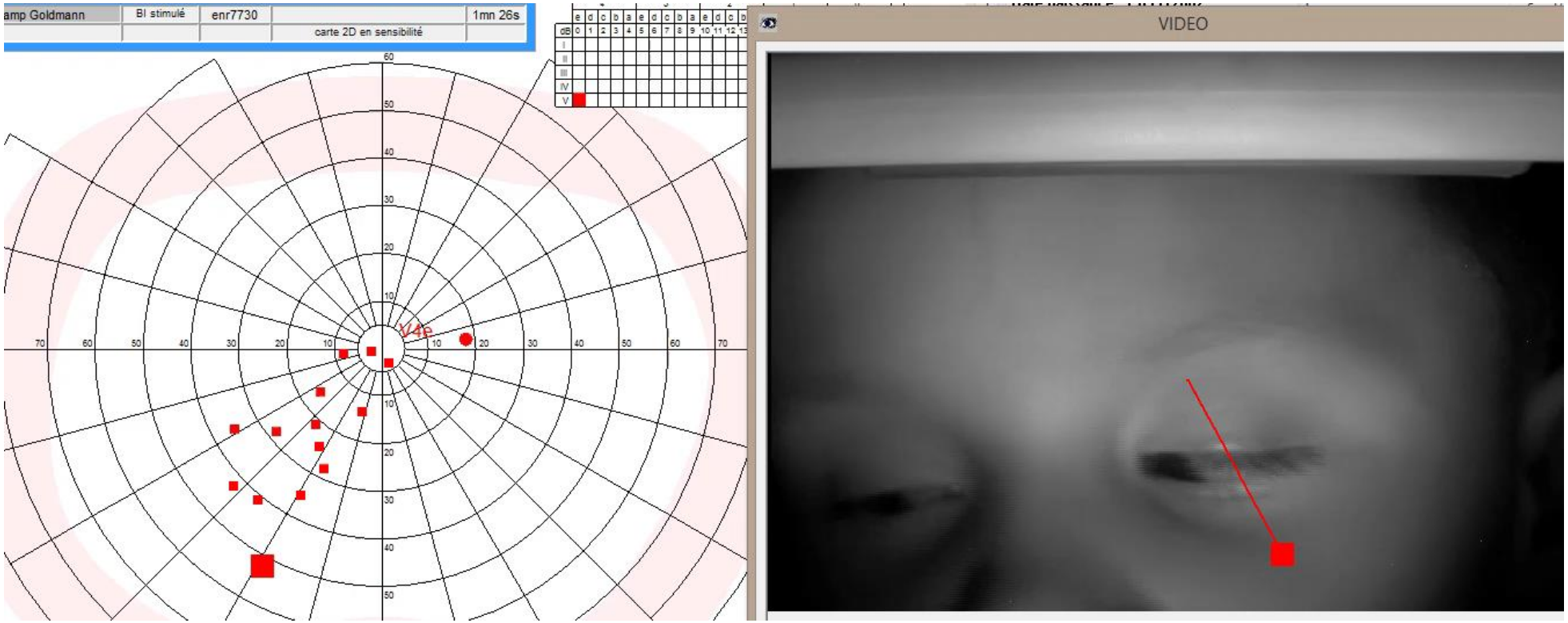
MonCvONE-PRO



Low vision: functional field of vision

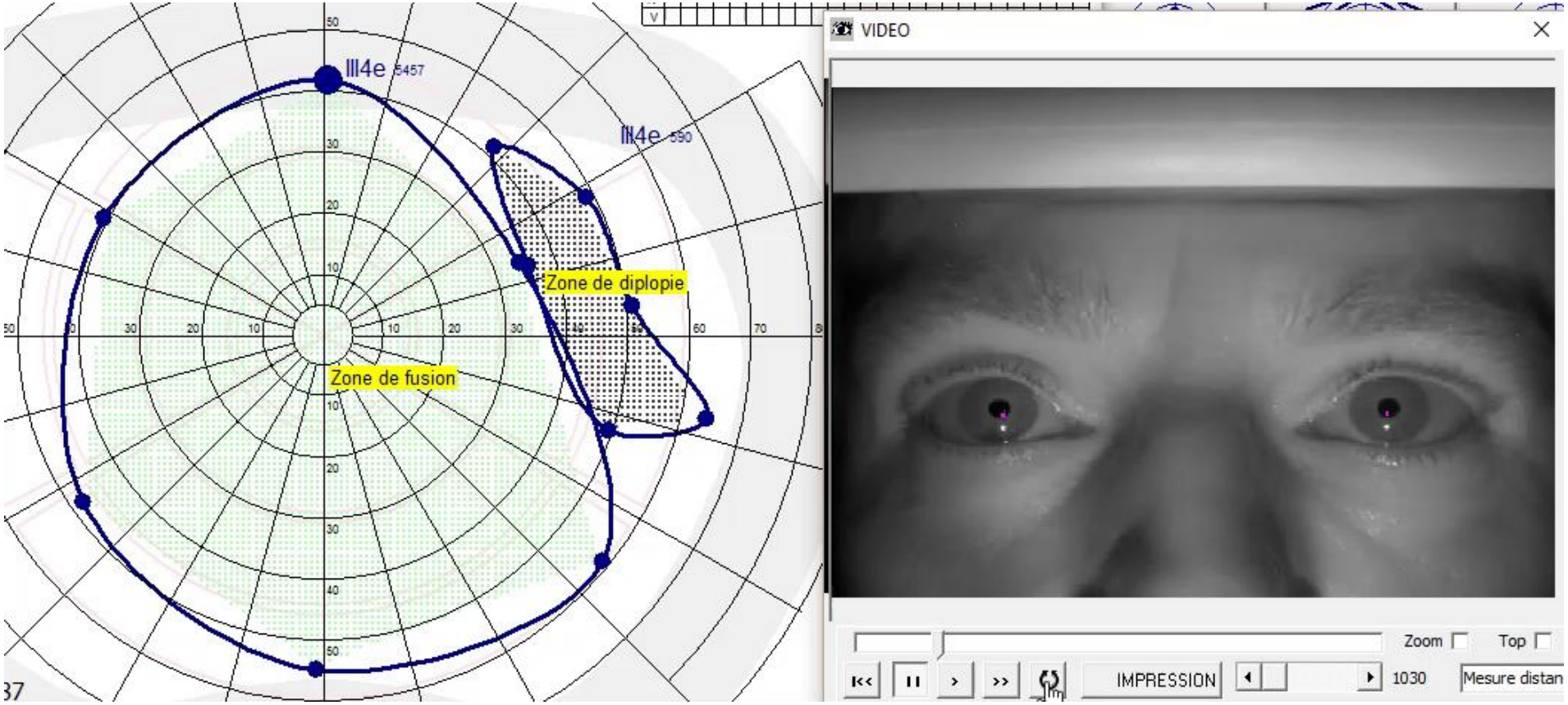
MonCvONE-PRO

- Mathis, 7 years old
- Optic glioma



Diplopia field

MonCvONE-PRO



SAP **Standard Automated Perimetry**

PRO Interactive Goldmann and video imaging

CR Clinical Research

CR++ Clinical Research with ERG

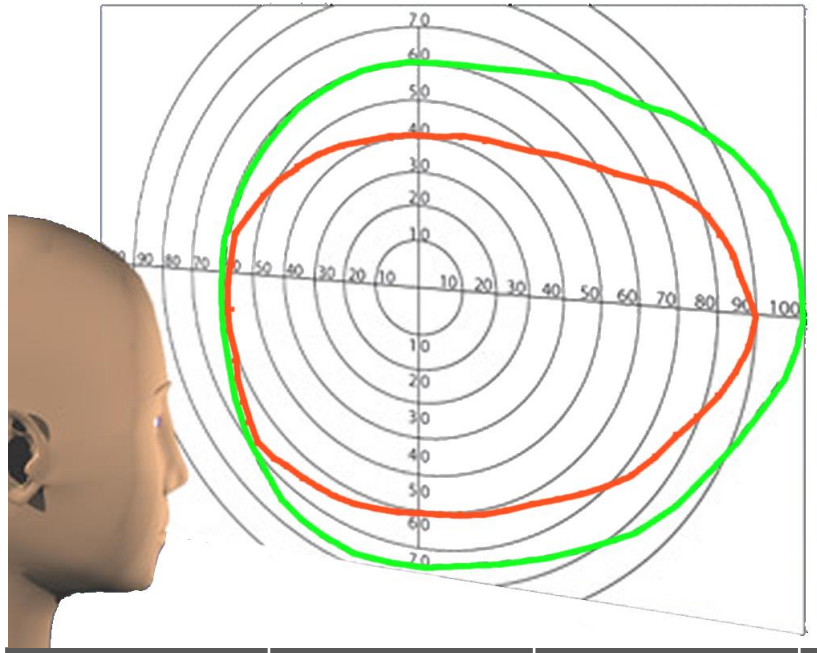
ARVO BOOTH 1336

MonCvONE-CR

Clinical Research

Ultra wide field perimetry

MonCvONE-CR



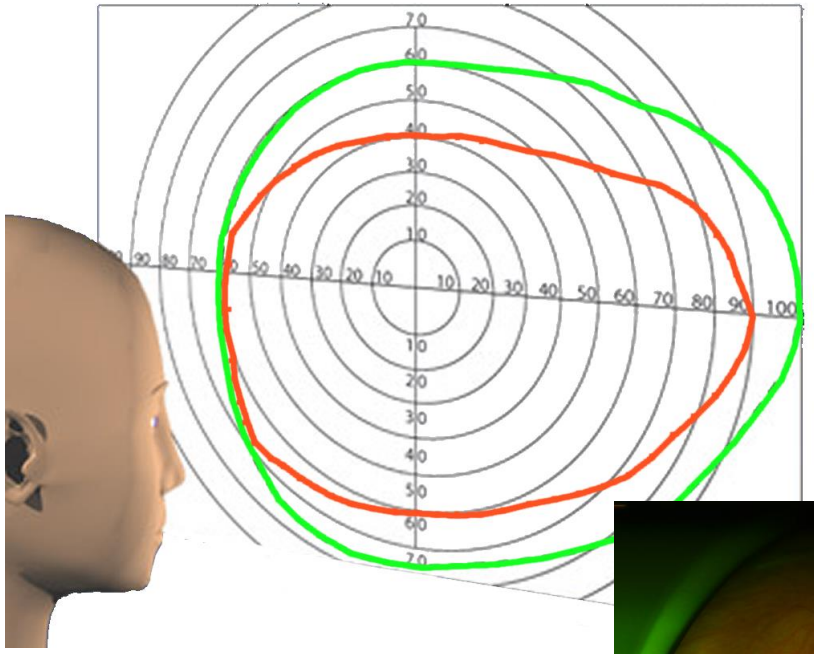
(degrees)	MonCvONE limits	HFA3 limits	Normal limits
Temporal	105	89	~105
Up	60	40	~60
Down	70	60	~70

- Reaches the TRUE limits of the visual field

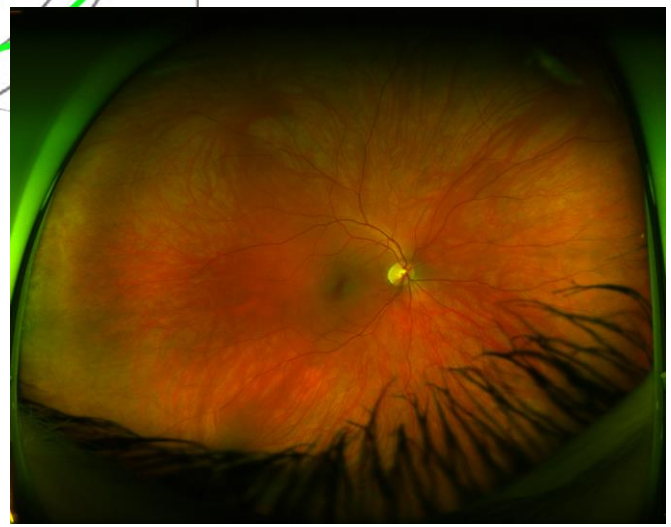
METROVISION

Ultra wide field perimetry

MonCvONE-CR



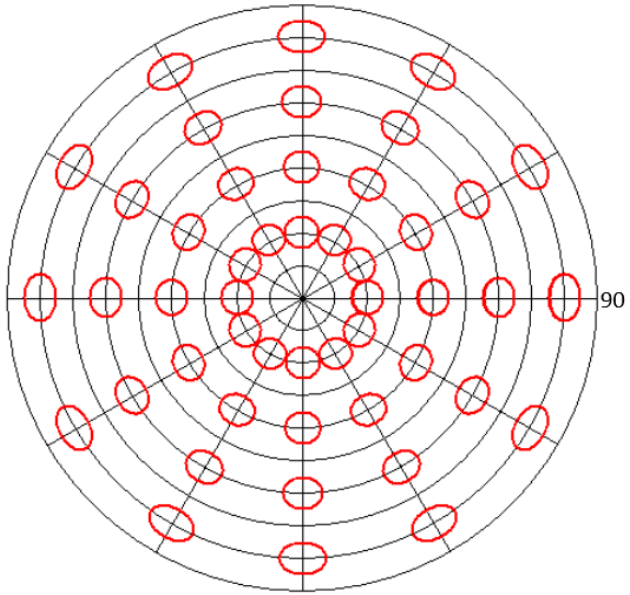
- Comparison with UWF imaging
- Complete visual function assessment
- Evaluation of dysphotopsia



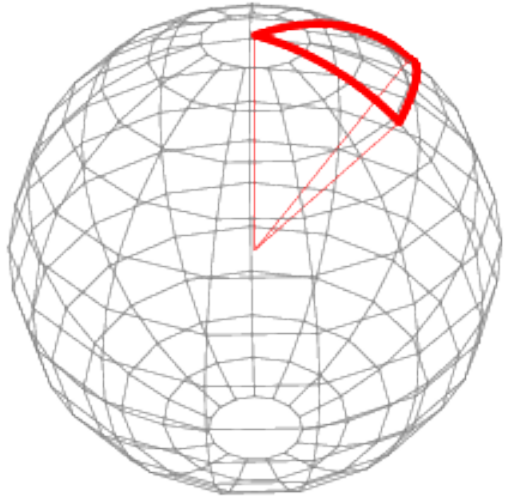
Goldmann perimetry
Quantification of isopters and scotoma

MonCvONE-CR

- Square degrees
- Steradians (more accurate)



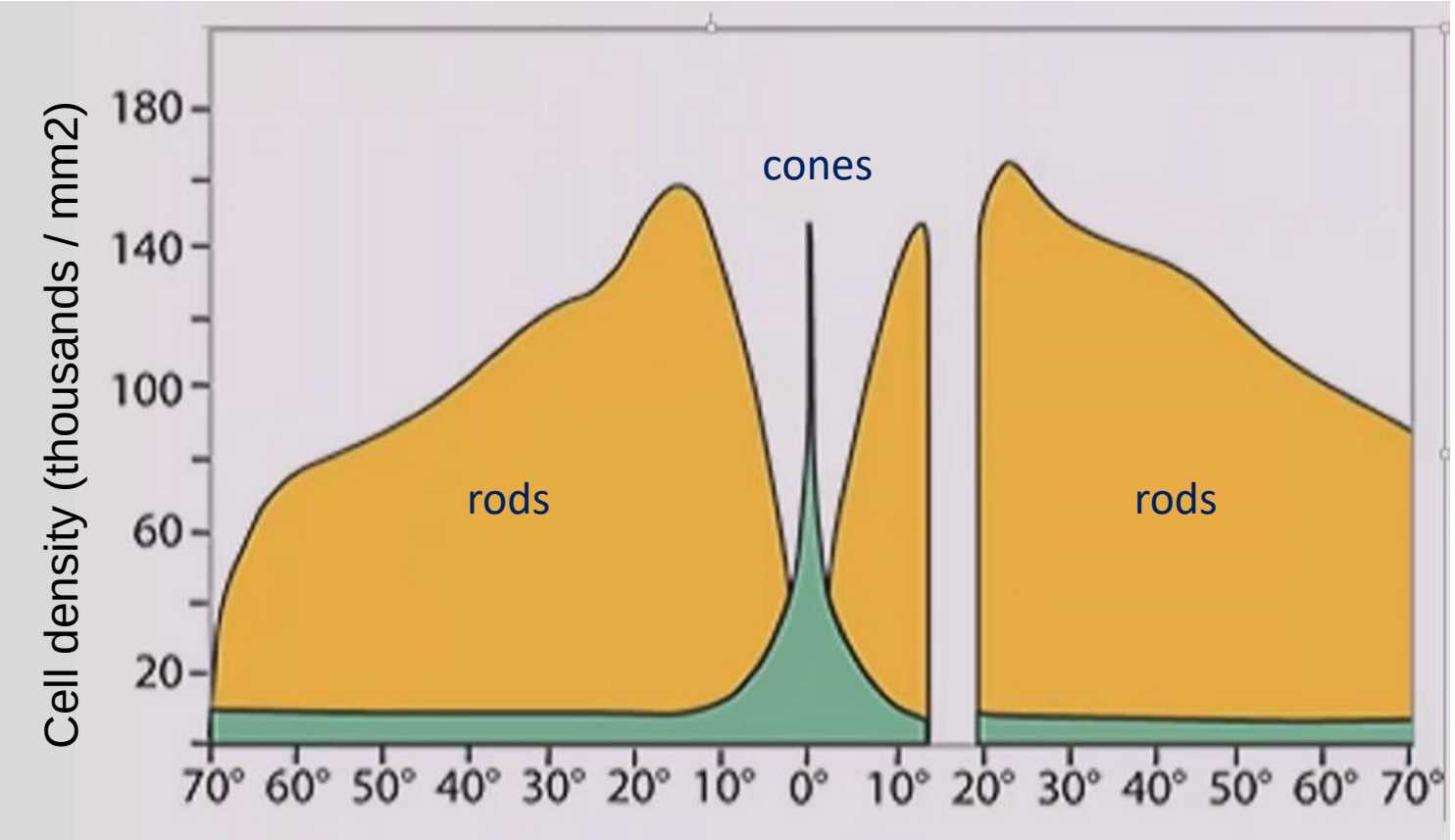
With the Goldmann planar projection, circular scotoma at 80 degrees of eccentricity appear 40% wider and their area is increased by 40%



Solution: use solid angles in steradians

Scotopic and mesopic perimetry

MonCvONE-CR



METROVISION

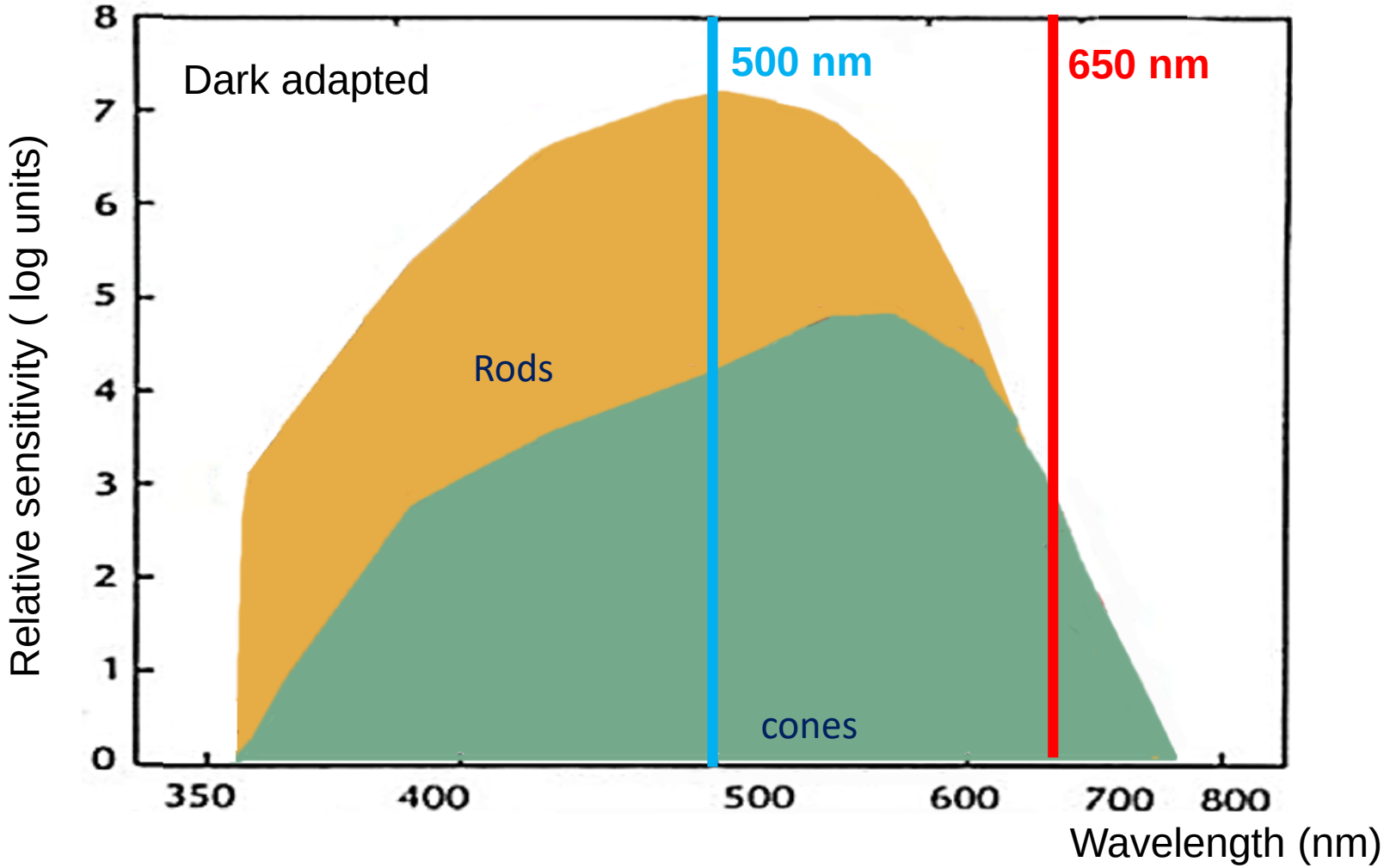
Dark adapted chromatic perimetry

MonCvONE-CR

- Robert MASSOF (1979..), Samuel JACOBSON (1986..)
- Highlighted the fact that there are different types of retinitis pigmentosa

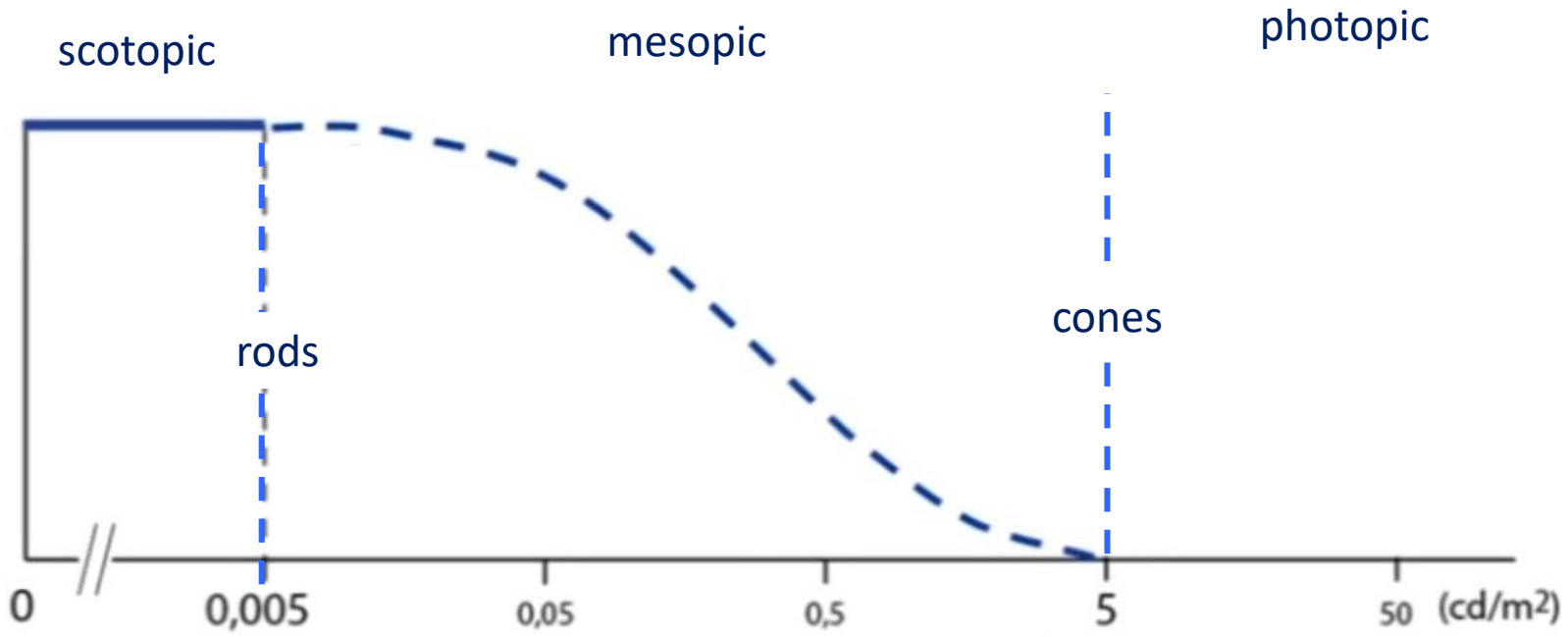
Dark adapted chromatic perimetry

MonCvONE-CR



Scotopic and mesopic perimetry

MonCvONE-CR



Scotopic and mesopic perimetry

MonCvONE-CR

MonCvONE-CR testing range

SAP testing range

Luminance (cd/m^2)	Level	Environment
10^{-6}	SCOTOPIC	Absolute threshold
10^{-5}		
10^{-4}		
0.001		
0.01		Full moon night
0.1	MESOPIC	
1		
10		Cloudy sky
100		
1000	PHOTOPIC	
10^{+4}		Bright sky
10^{+5}		

METROVISION

Programmable background luminance

MonCvONE-CR

- Programmable background luminance:
  Scotopic,
  Mesopic: 0.032, 0.10, 0.32, 1.0, 3.2 cd/m2
  Photopic: 10, 32, 100, 320 cd/m2

- Programmable background color:
  white, yellow (591nm), blue (447nm), red (655nm)

METROVISION

Programmable stimulus

MonCvONE-CR

- Stimulus color: white + ND 30dB
  + 4 user defined dichroic color filters
- Stimulus size: I .. V
- Dynamic range: 110 dB for white stimuli
- Dynamic range: 70 dB for color stimuli

METROVISION

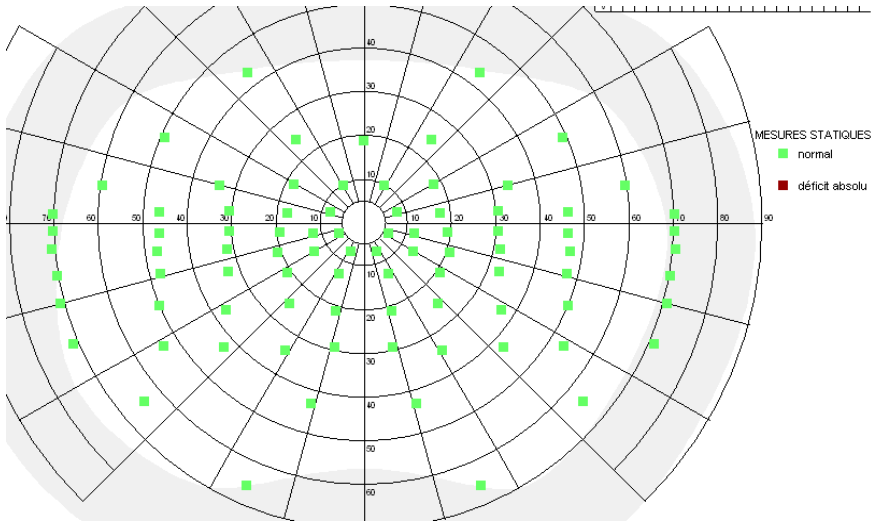
Mesopic vision - Driving at night

MonCvONE-CR

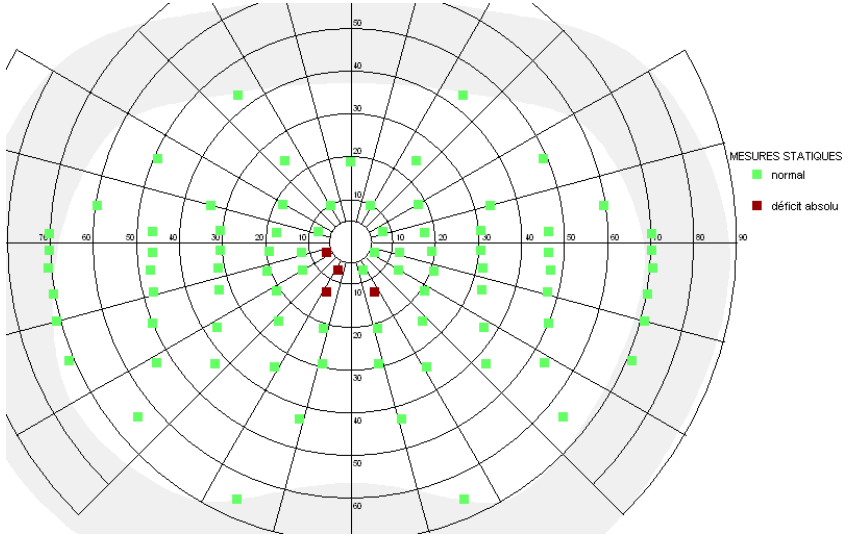
METROVISION

Patient with complaint driving at night

MonCvONE-CR



10	
100	
1000	PHOTOPIC
10^{+4}	
10^{+5}	

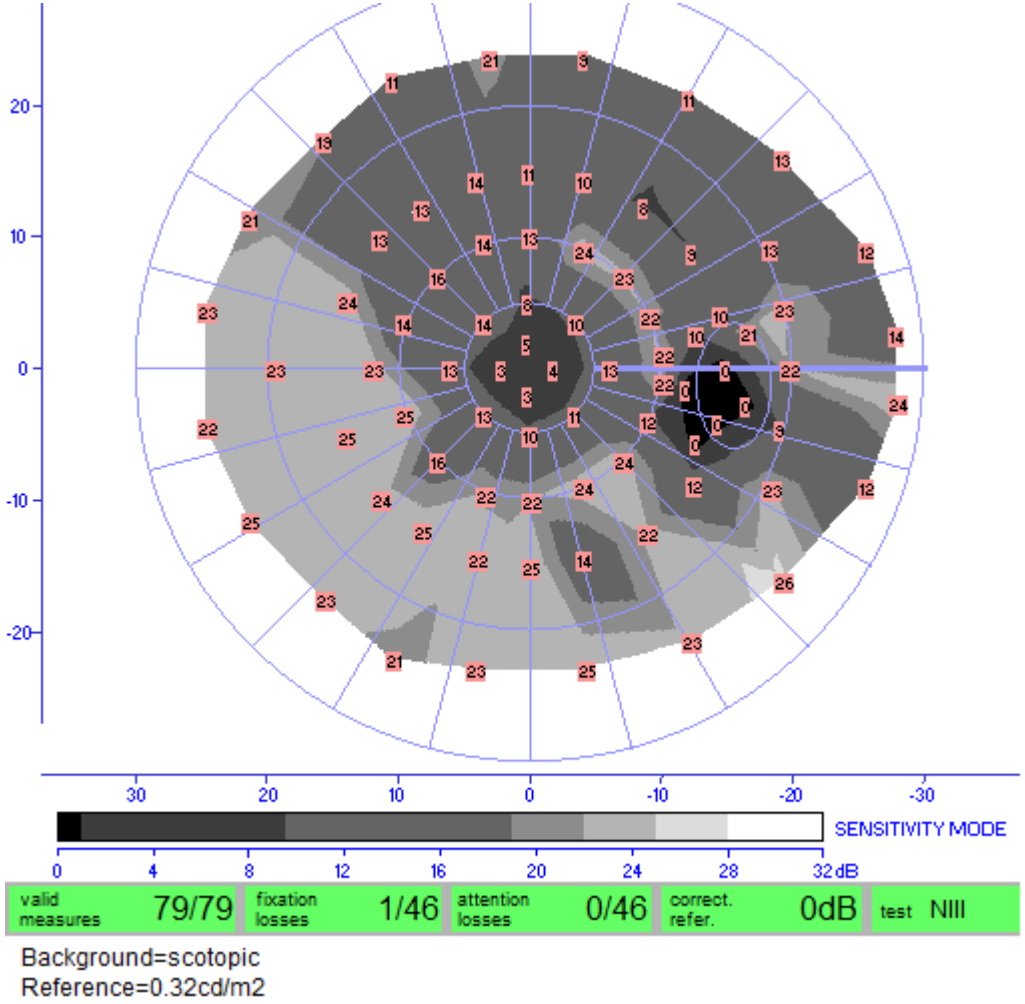


0.001	
0.01	
0.1	MESOPIC
1	

Scotopic Perimetry

MonCvONE-CR

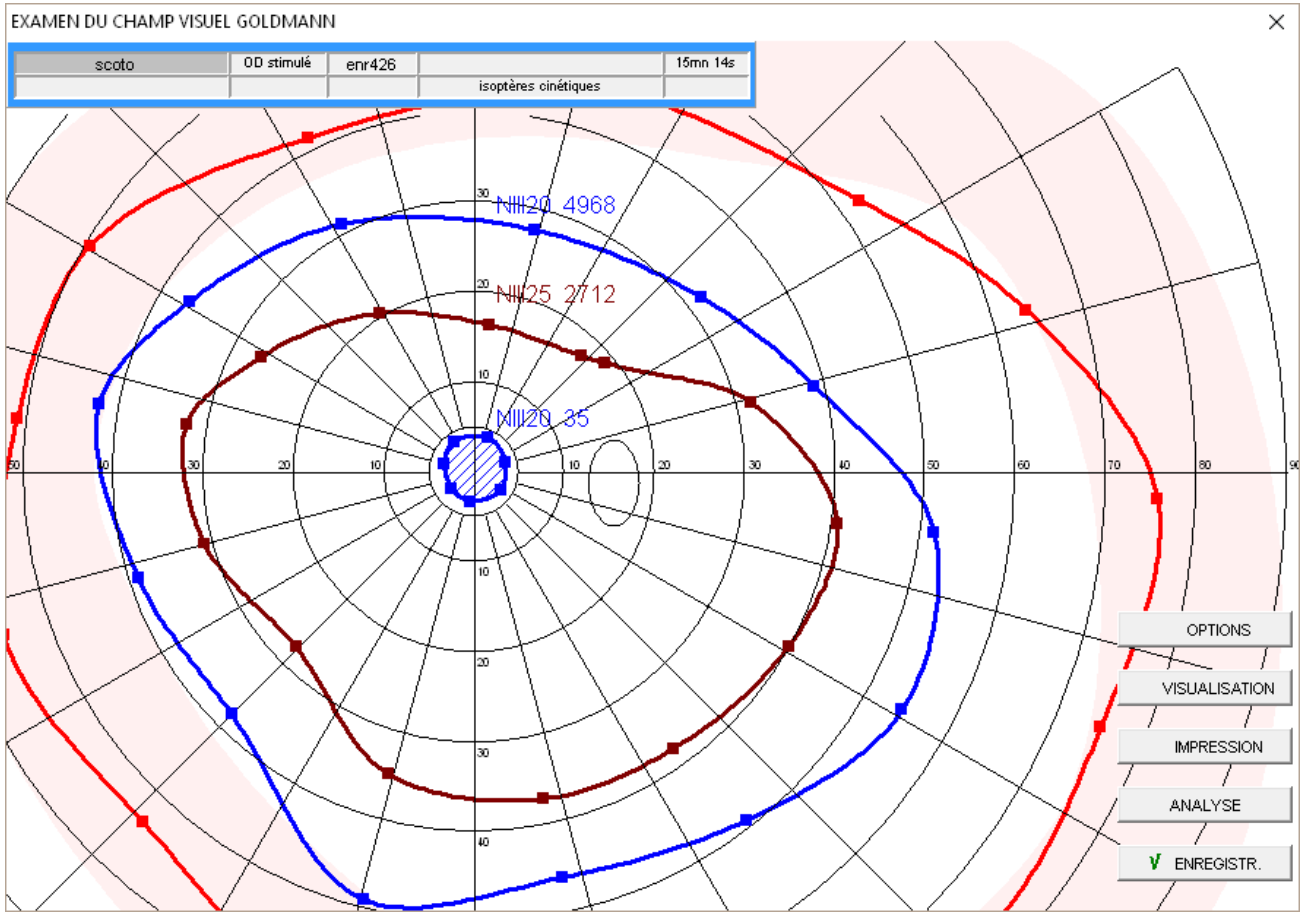
Stimulus: white size III
Background: scotopic
Procedure: static 8-4-2 staircase



Scotopic Perimetry – manual Goldmann

MonCvONE-CR

Stimulus: white size III
Background: scotopic
Procedure: manual



Dark adaptometry

MonCvONE-CR

- Programmable light adaptation
  up to 600 cd/m2
- Deep red fixation spot
- Goldmann size V
- Up to 10 different locations
  anywhere in the entire visual field
- Choice of color:
  white +ND 30 dB + 4 user defined color filters
- 75 dB dynamic range

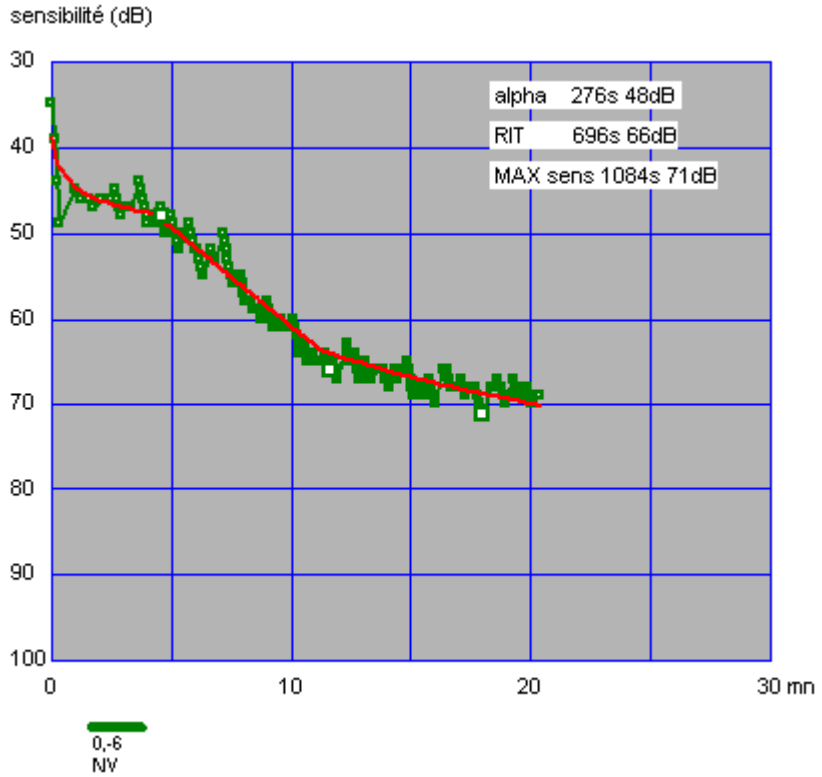
METROVISION

Dark adaptometry

MonCvONE-CR

DA exam performed with white stimulus on a normal subject:

Automated quantification of
- Alpha point
- Rod intercept time (RIT)
- Maximum sensitivity



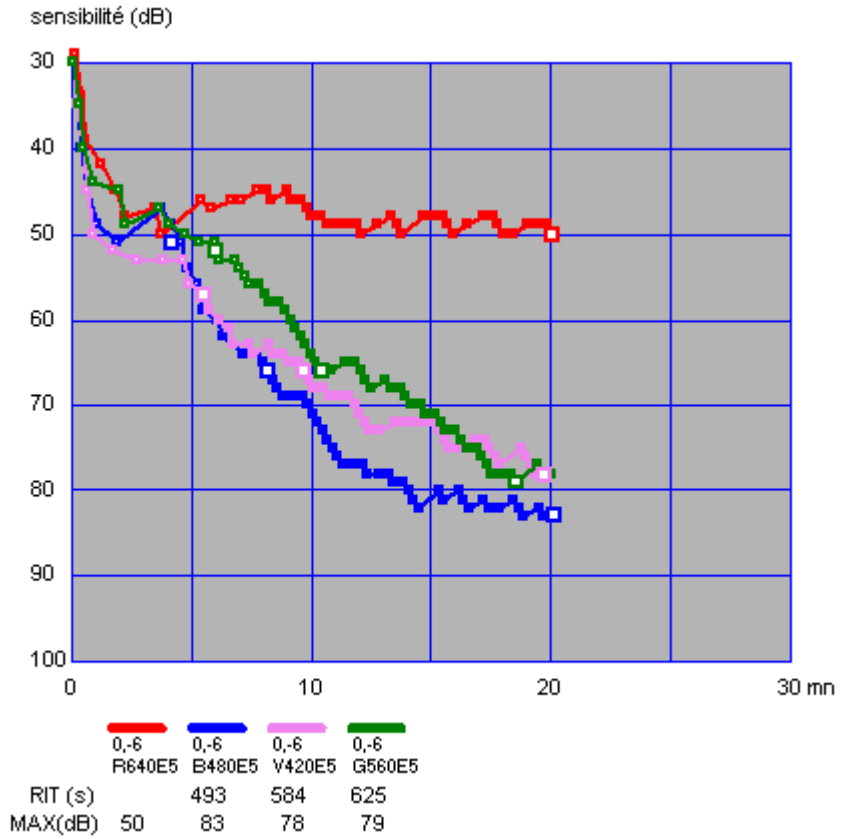
Dark adaptometry

MonCvONE-CR

Can test up to 10 different locations / colors

DA exam performed with 4 colors
on a normal subject:
violet 420nm, blue 480nm,
green 560nm, red 640nm

6 degrees below fixation
0dB=318cd/m2



Full field stimulus threshold (FST test)

MonCvONE-CR

- Roman & al (2005)
- Measure the terminal threshold using a full field stimulus

PRO

- Rapid
- Less fixation constraint

CON

- No local information (localization and spread of alternations)

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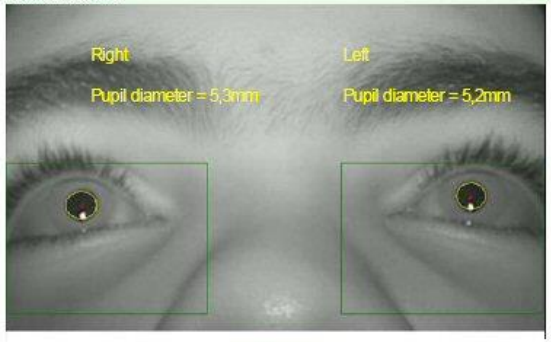
Pupillometry

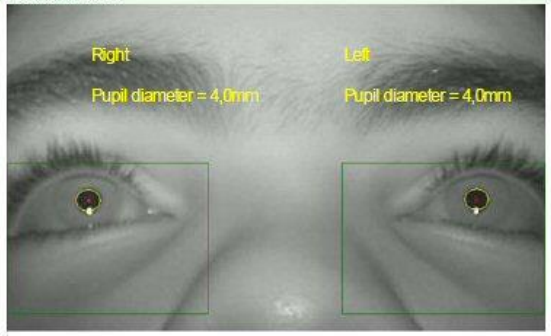
MonCvONE-CR

SUMMARY OF EXAMS

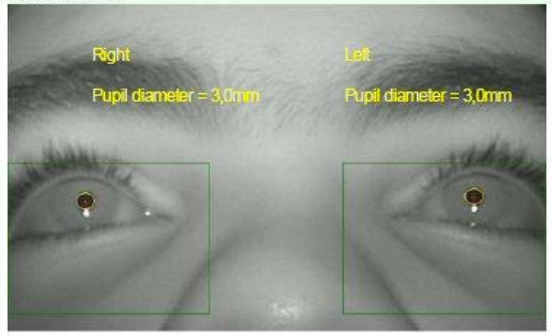
PUPILS scotopic 25/10/2007
BI stimulated



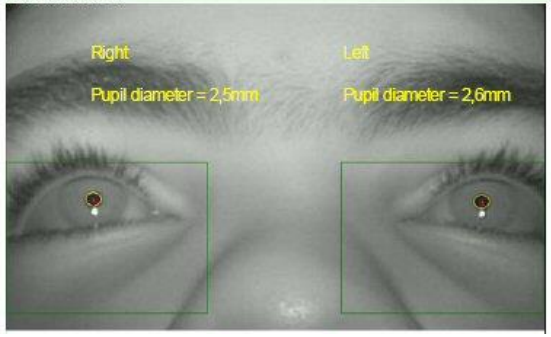
PUPILS mesopic 25/10/2007
BI stimulated



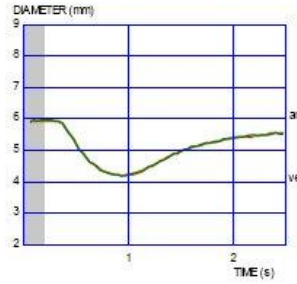
PUPILS photopic low 25/10/2007
BI stimulated



PUPILS photopic high 25/10/2007
BI stimulated



Test 0 23/11/2007
BI stimulated



AVERAGED RESPONSE

	OD	OS
Valid Responses =	5	5
Rejected responses =	2	2
Initial diameter(mm) =	5,9	6,0
amplitude of contraction(mm) =	1,7	1,8
latency of contraction(ms) =	367	367
duration of contraction(ms) =	567	600
velocity of contraction(mm/s) =	4,97	4,97
latency of dilation(ms) =	933	967
duration of dilation(ms) =	1567	1433
velocity of dilation(mm/s) =	1,88	1,81

result without first response

Vision Monitor
Mon2009F

Metrovision
4 rue des platanes
59640 Pérenchies
France
tél 33 (0)3 20 17 19 60
http://www.metrovision.fr

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SAP **Standard Automated Perimetry**
PRO Interactive Goldmann and video imaging
CR Clinical Research
CR++ Clinical Research with ERG

ARVO BOOTH 1336

MonCvONE-CR++

Clinical Research with ERG (*)

(*) Not available in the US

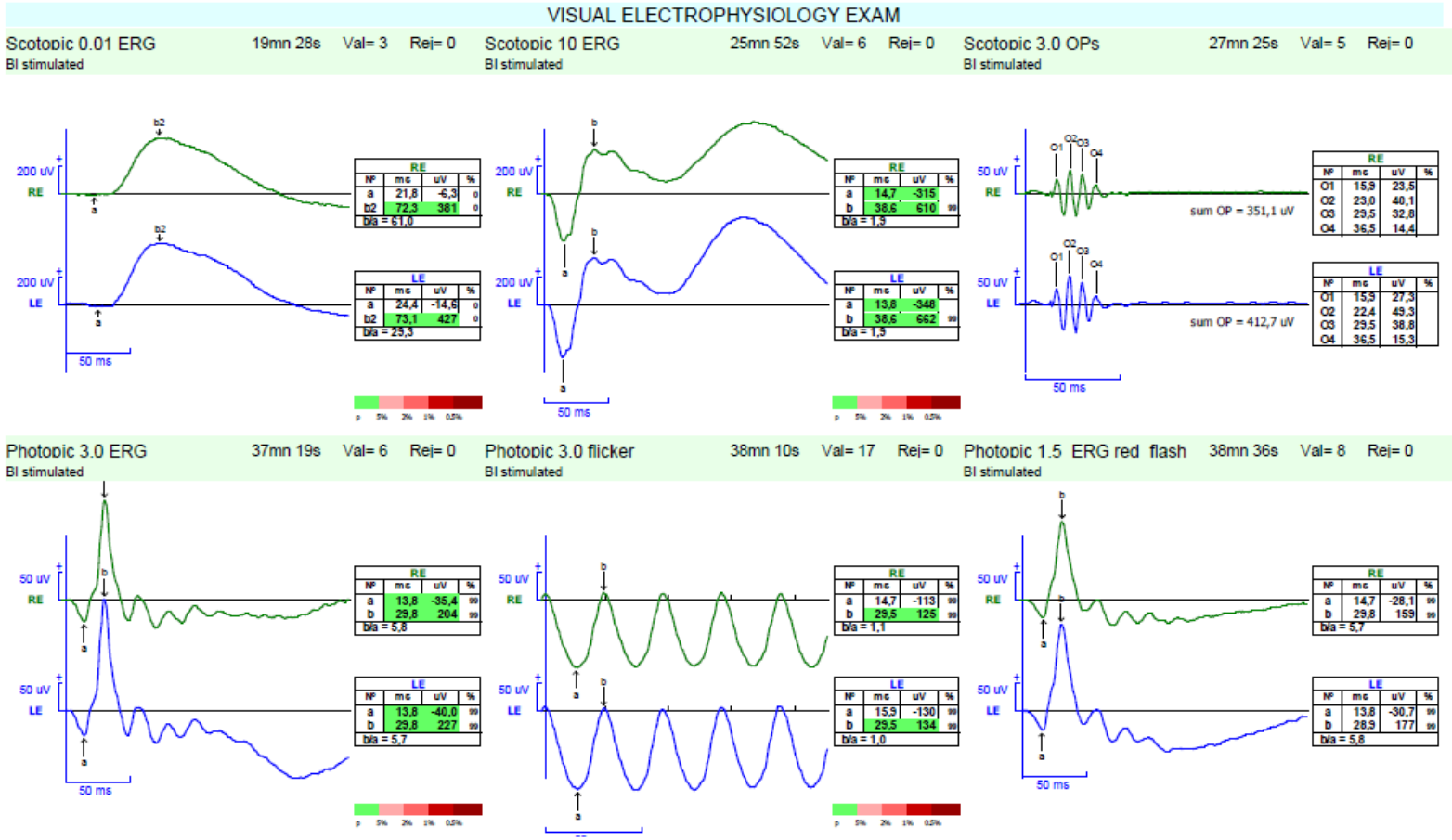
Flash Electroretinography

MonCvONE-CR++

- Ganzfeld background and flash stimuli
- Stimulus / Background color
  white, yellow (591nm), blue (447nm), red (655nm)
- Programmable stimulus intensity, duration and frequency
- ISCEV protocol
- NIR video monitoring and recording

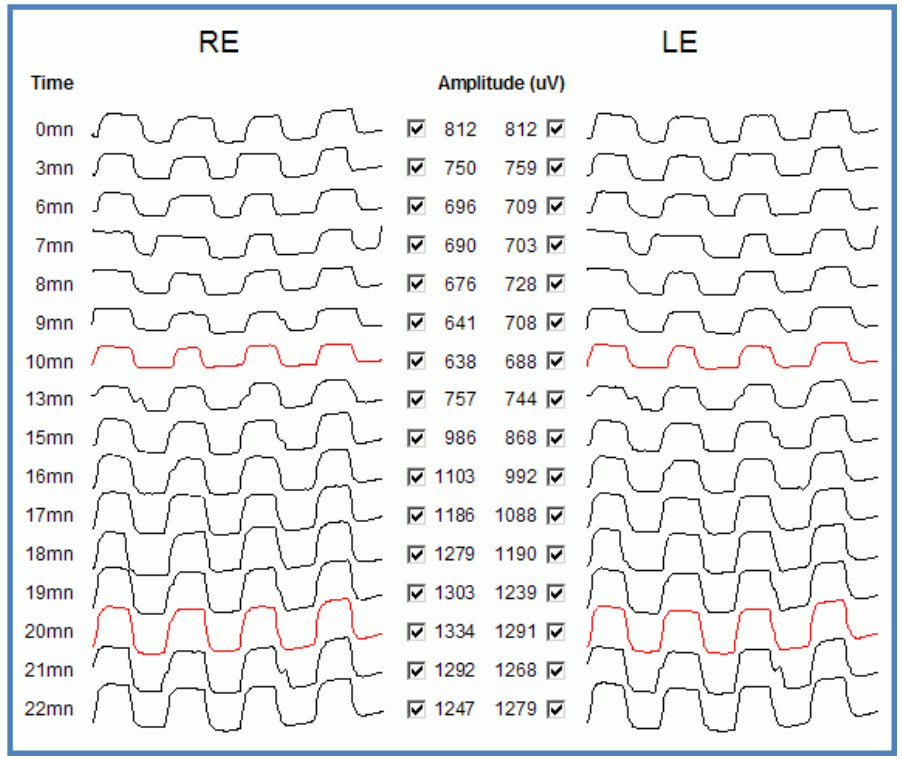
Flash Electroretinography

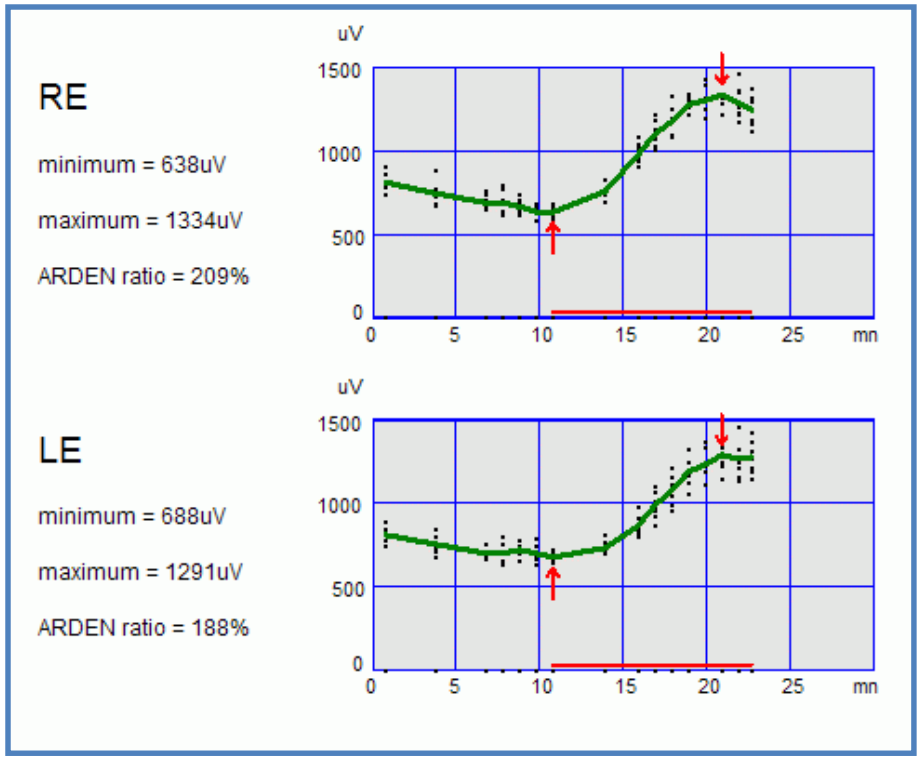
MonCvONE-CR++



Sensory EOG

MonCvONE-CR++

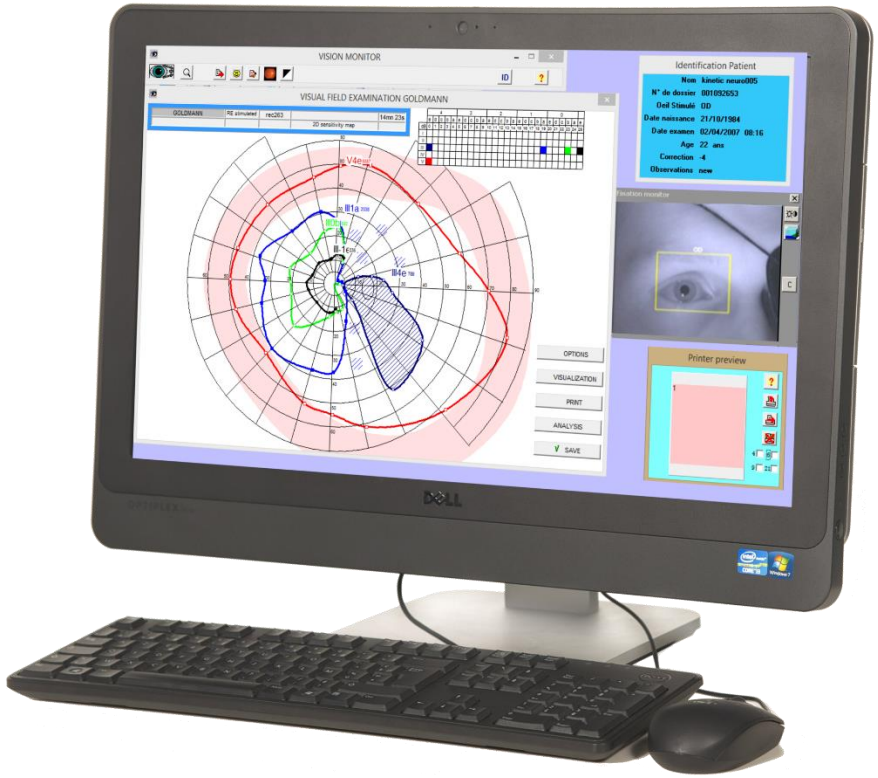




Computer interface and networking

MonCvONE

- standard PC or tablet operating under Windows 10
- access to results from work stations
- exportation under **PDF**, **DICOM** or **EXCEL** format



MonCvONE version SAP

MonCvONE-SAP

	SAP	PRO	CR	CR+++
Full field projection	Yes	Yes	Yes	Yes
Stimulus size I to V	Yes	Yes	Yes	Yes
Photopic background (10 cd/m2)	Yes	Yes	Yes	Yes
FAST60, FAST30, FAST24 FAST12, FOVEA	Yes	Yes	Yes	Yes
Mixed perimetry (kinetic+static)	Yes	Yes	Yes	Yes
Binocular driving test	Yes	Yes	Yes	Yes
Binocular low vision test	Yes	Yes	Yes	Yes
Large field correction for refraction	Yes	Yes	Yes	Yes

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MonCvONE version PRO

MonCvONE-PRO

	SAP	PRO	CR	CR+++
Blue / yellow perimetry		Yes	Yes	Yes
Manual Goldmann perimetry		Yes	Yes	Yes
Video imaging		Yes	Yes	Yes
Attraction perimetry (for infants…)		Yes	Yes	Yes
Fusion field (diplopia test)		Yes	Yes	Yes
Ptosis evaluation		Yes	Yes	Yes

MonCvONE versions CR

MonCvONE-CR

	SAP	PRO	CR	CR+++
Ultra wide field perimetry			Yes	Yes
Programmable background from scotopic to photopic			Yes	Yes
User defined dichroic filters (4)			Yes	Yes
Dark adapted chromatic perimetry			Yes	Yes
Dark adaptometry			Yes	Yes
FST test			Yes	Yes
Pupillometry			Yes	Yes

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MonCvONE versions CR++

MonCvONE-CR++

	SAP	PRO	CR	CR+++
Vision electrophysiology (flash ERG VEP)				**Yes**
Vision electrophysiology (EOG)				**Yes**

MonCvONE-CR / other products

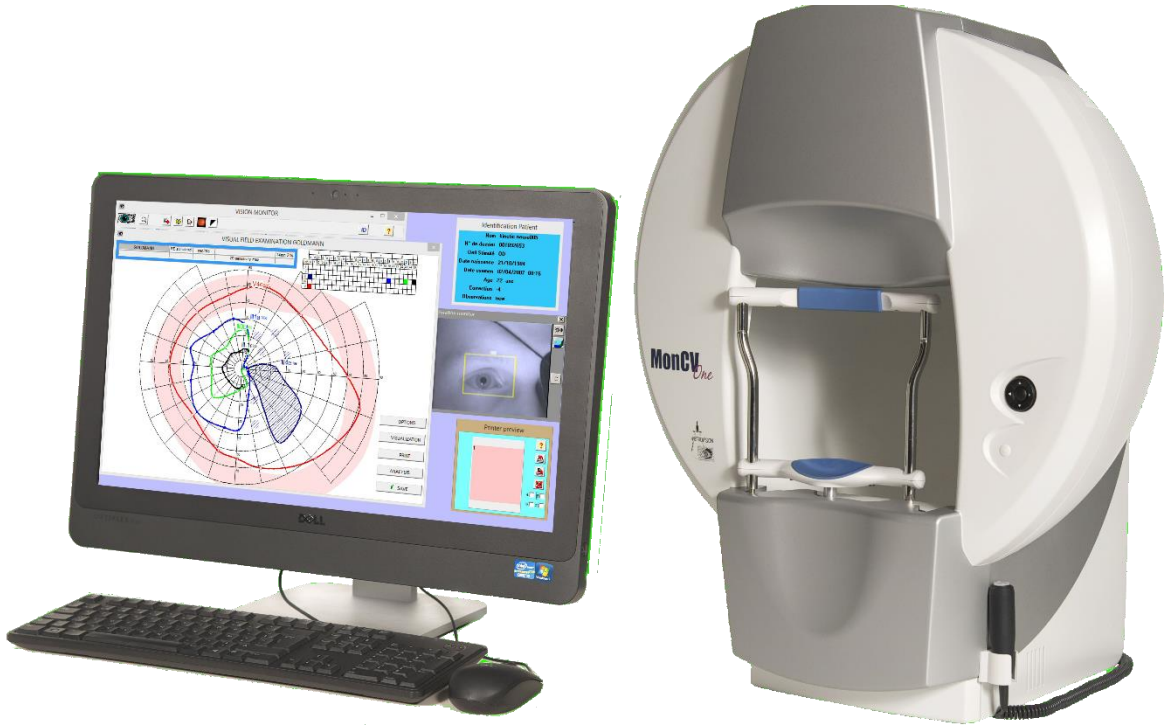
MonCvONE-CR

	Standard Automated Perimetry	Goldmann Perimetry	DA Static Perimetry	DA Goldmann perimetry	Dark Adaptometry	FST Test	Pupillometry	ERG
	★							
		★						
						★	★	★
					★			
			★					
	★	★	★	★	★	★	★	★

MonCvONE - Multifunction perimeter

METROVISION

Advantages of a multifunction instrument



- ❖ Gain of space
- ❖ Optimization of use
- ❖ A single interface
- ❖ A single database

- International

  Metrovision, Lille, France

  www.metrovision.com

  contact@metrovision.com

  +33.320.17.1950

- In USA

  SRD Vision, Philadelphia

  www.srdvision.com

  tnewill@srdvision.com

  +1.347.321.8518