Vision Monitor
Control of Fixation

Introduction

The **"Control of Fixation"** option of the **Vision Monitor** provides several services:

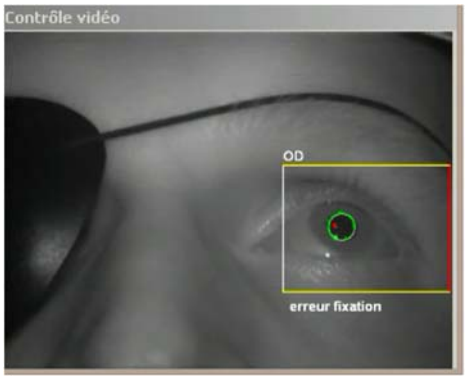
- The recording of eye movements and pupil size during exams and the generation of a report with a quantitative analysis of fixation stability, deviation as well as pupil size and blink rate;
- The recording of the video during exams, its replay in synchrony with the examination results and the inclusion of video extracts in the examination report;
- The automated rejection of examination results in case of fixation deviation or blinks;
- The measurement of pupil size

This option (PVM-CF) is available on all Vision Monitor equipments.
Several additional options are available on the Vision Monitor system and are described in separate documents:

- PVM-PU for the analysis of pupil responses to flashes of light
- PVM-YE for the analysis of nystagmus, saccades and pursuits

The Vision Monitor eye tracker

All Vision Monitor systems are equipped with an eye tracker. The eye tracker uses near-infrared light (940nm) which is not visible, or barely visible after prolonged dark adaptation.
The video image is processed in real time to perform measurements of the eye orientation and pupil size of both eyes.
The standard version operates at 30 images per second. A 200Hz version is also available for more accurate measurements of fast eye movements.

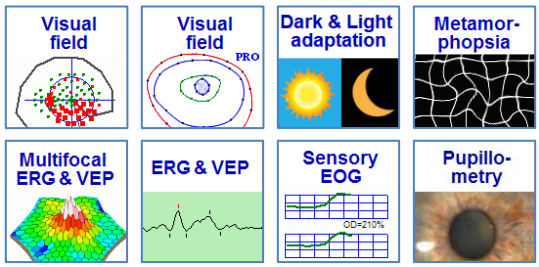


Eye movement recording and analysis

Eye orientation is measured from the position of the corneal reflex relative to the pupil and is therefore not sensitive to head movements.

It is available for the following tests:

- automated visual field perimetry,
- manual (Goldmann) perimetry,
- dark adapted chromatic perimetry,
- dark adaptometry,
- flash and pattern ERG and VEP,
- multifocal ERG and VEP
- …



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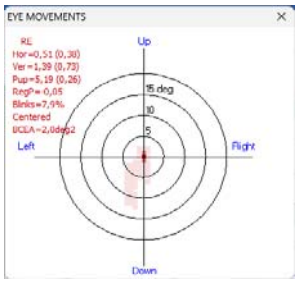
The following graph is displayed at the end of the examination:

- the different shades of color indicate where fixation occurs most frequently
- **BCEA** (Bivariate Contour Ellipse Area in square degrees) provides an indication of the stability of fixation with 68% of fixation positions lying within this area
- **Pup** indicates the average pupil diameter in millimeters.
- **Blinks** indicates interruption of the recording due most frequently by blinks in percentage.



Video recording and analysis

A video can be recorded during all exams performed on the Vision Monitor.

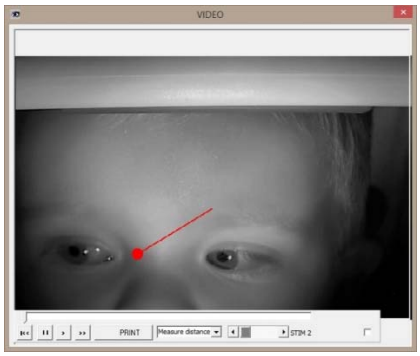
The video of the examination can be replayed in synchrony with the examination procedure.

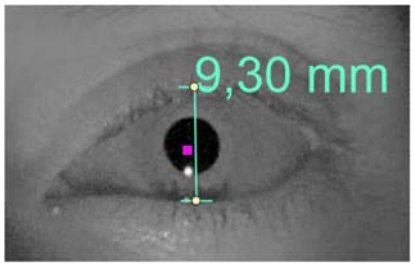
In case of abnormal results, this tool allows the control of visual field as well as visual electrophysiology results by providing evidence of ptosis, abnormal blinking, nystagmus, misalignment of refractive lenses, abnormal head position and head movements, etc…

A snapshot of the video can be included in the examination report to document these artifacts.

Video recording and replay can also be used for the documentation of abnormal eye movements and for the analysis of eye movement responses during attraction perimetry exams

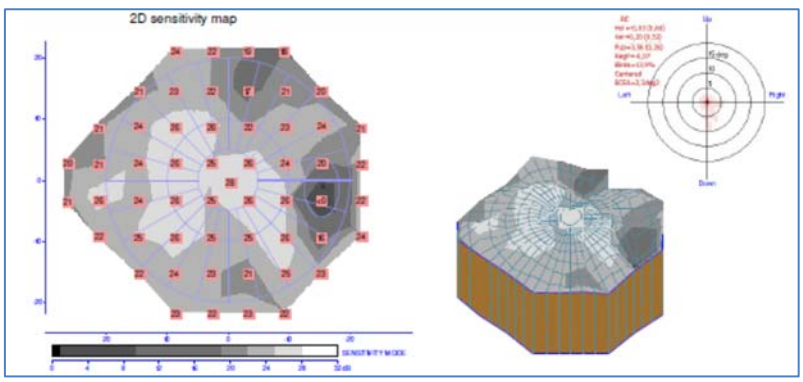
Measurements of distances can be performed from the video: including the opening of the eye lids or the interpupillary distance

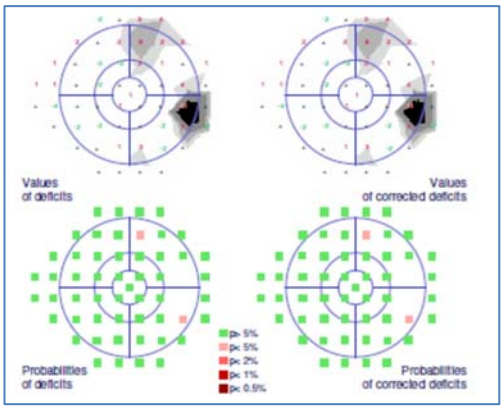




Examples

Standard automated perimetry





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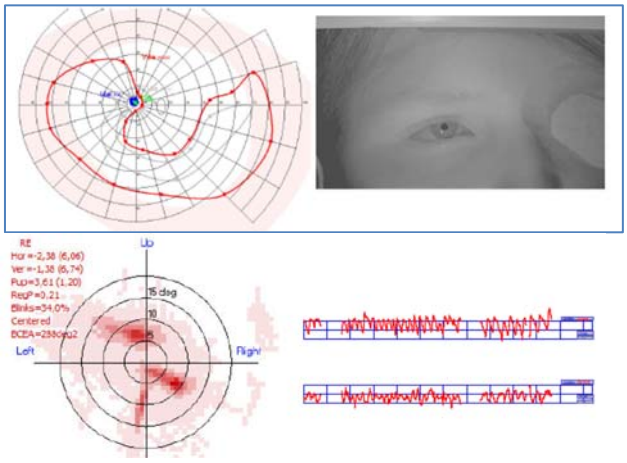
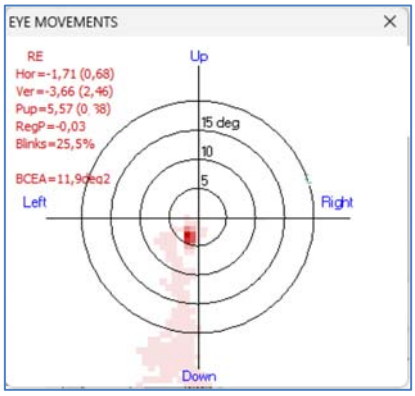
Goldmann perimetry

The recorded video and eye movement are saved as separate files in the data base and they can be read individually.
This allows to analyze the eye movement record in more details as shown in the present example where the video and eye movements were recorded during perimetry on a subject with instable fixation. The horizontal and vertical components of the eye movements can be analyzed separately.



Dark adaptometry exam

in 5 different locations
with control of fixation stability



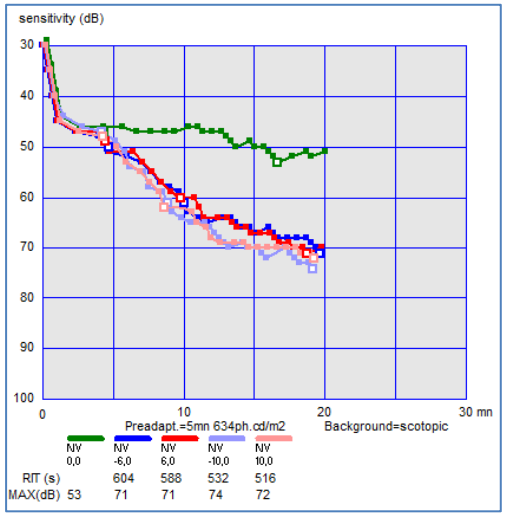
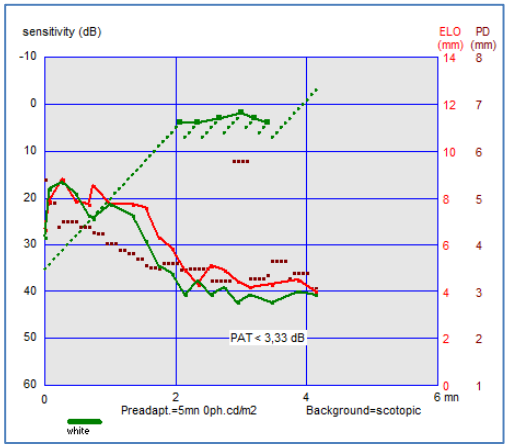


Photo Aversion Threshold test

Result from a normal subject showing

- The strength of the stimulus (dotted green line),
- The opening of the eye lids (red for right eye and green for left eye)
- The pupil diameter (brown)



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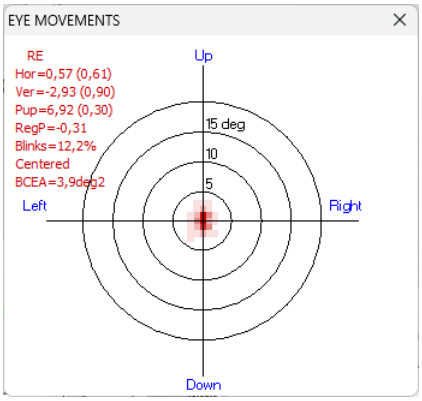
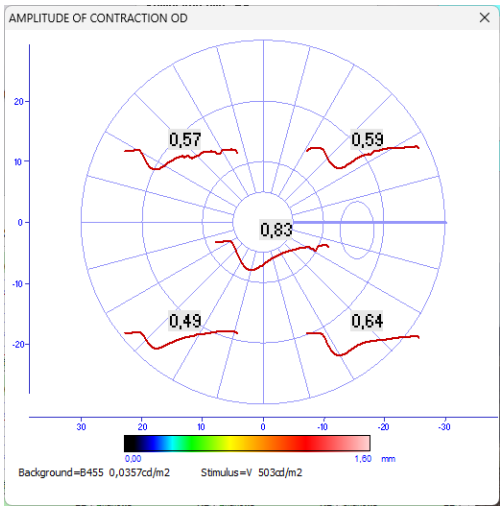
Pupillometry responses to local stimulations

with recording of fixation stability





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