

Evaluation of a new technique for the comparison of wide field eye fundus images and perimetry

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Purpose

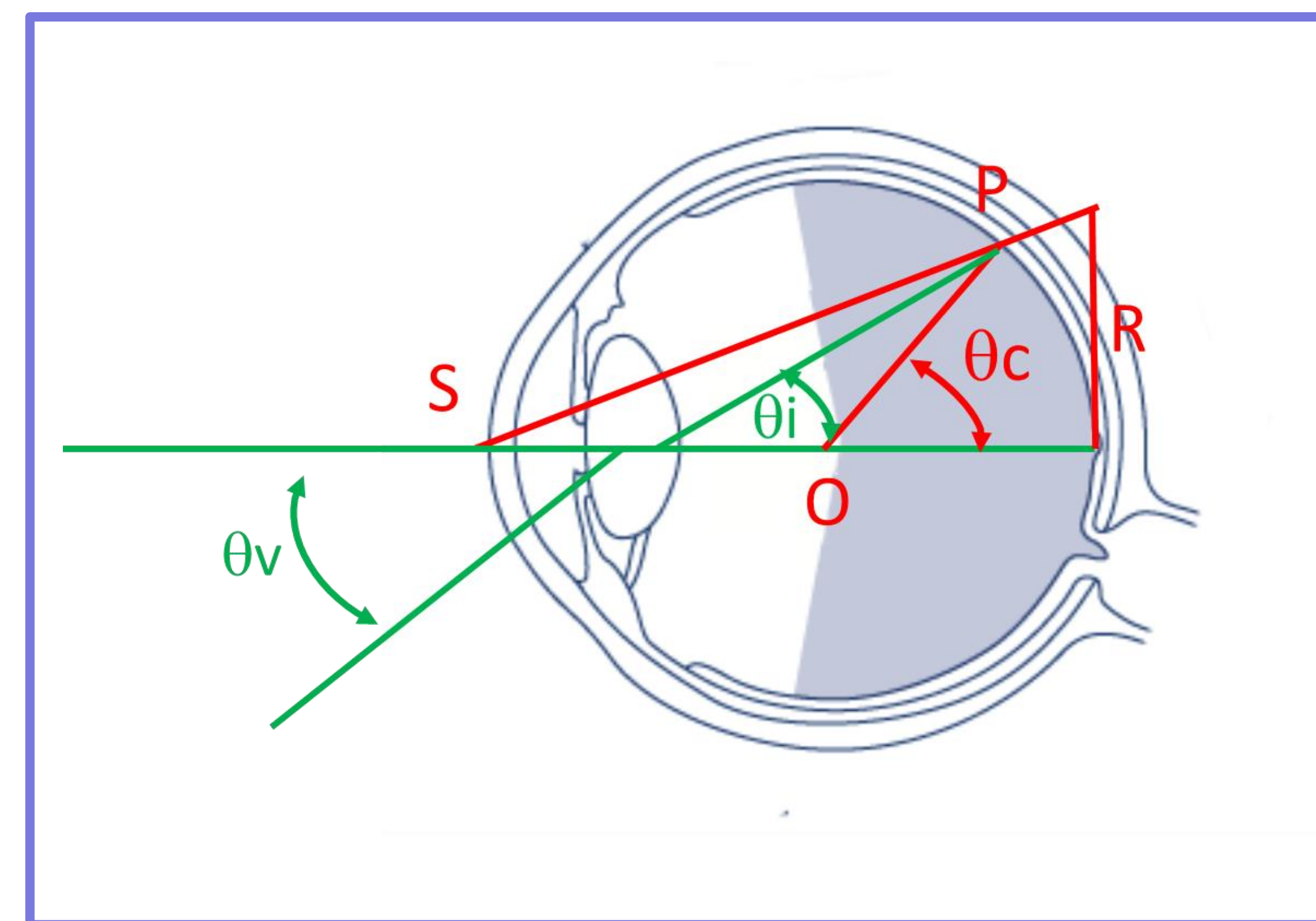
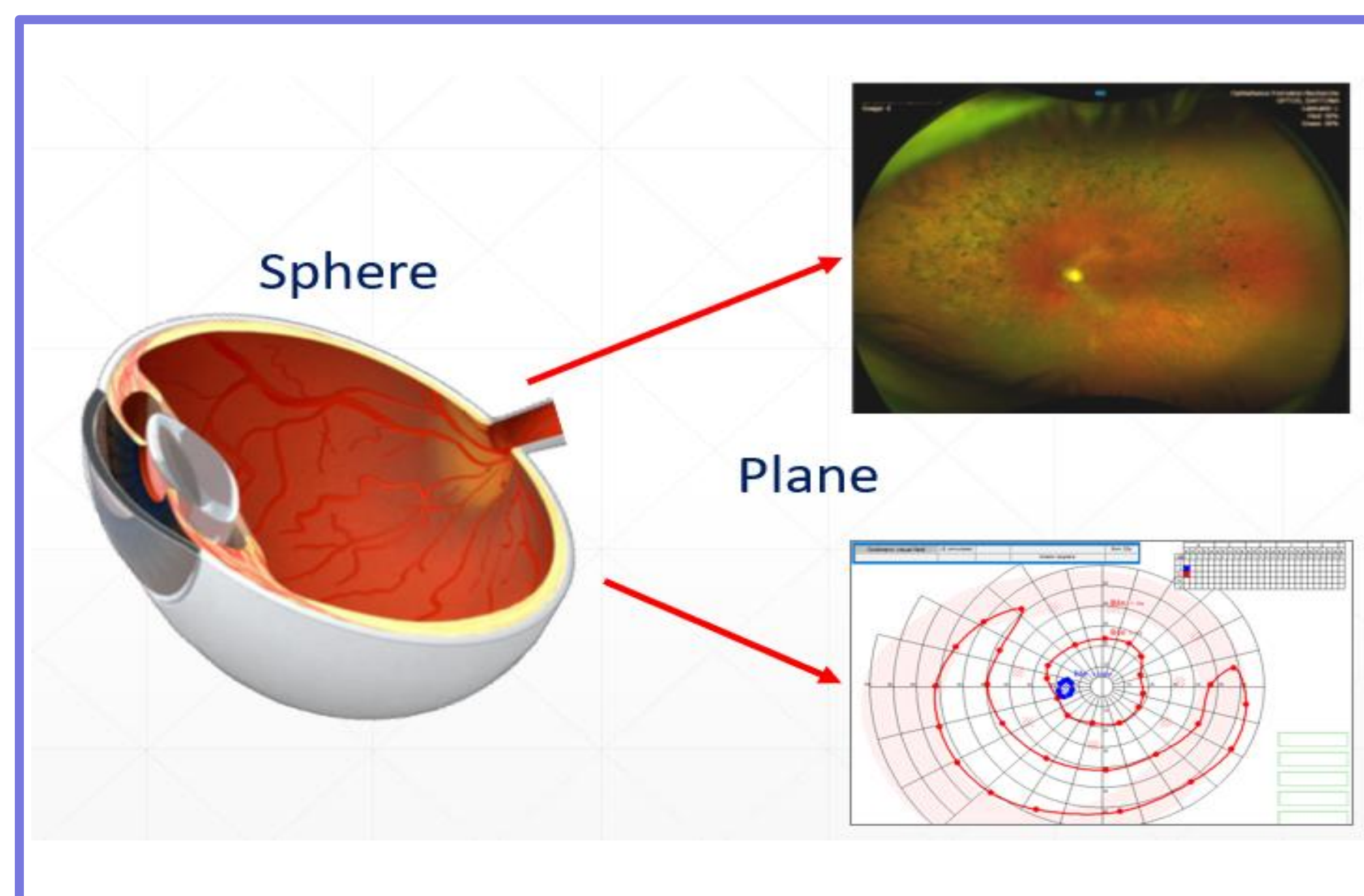
The comparison of wide field eye fundus images (WFI) and functional tests is of great interest in a number of diseases of the retina. The purpose of this study was to evaluate a new technique for the comparison of WFI and wide field perimetry results (WFP).

Methods

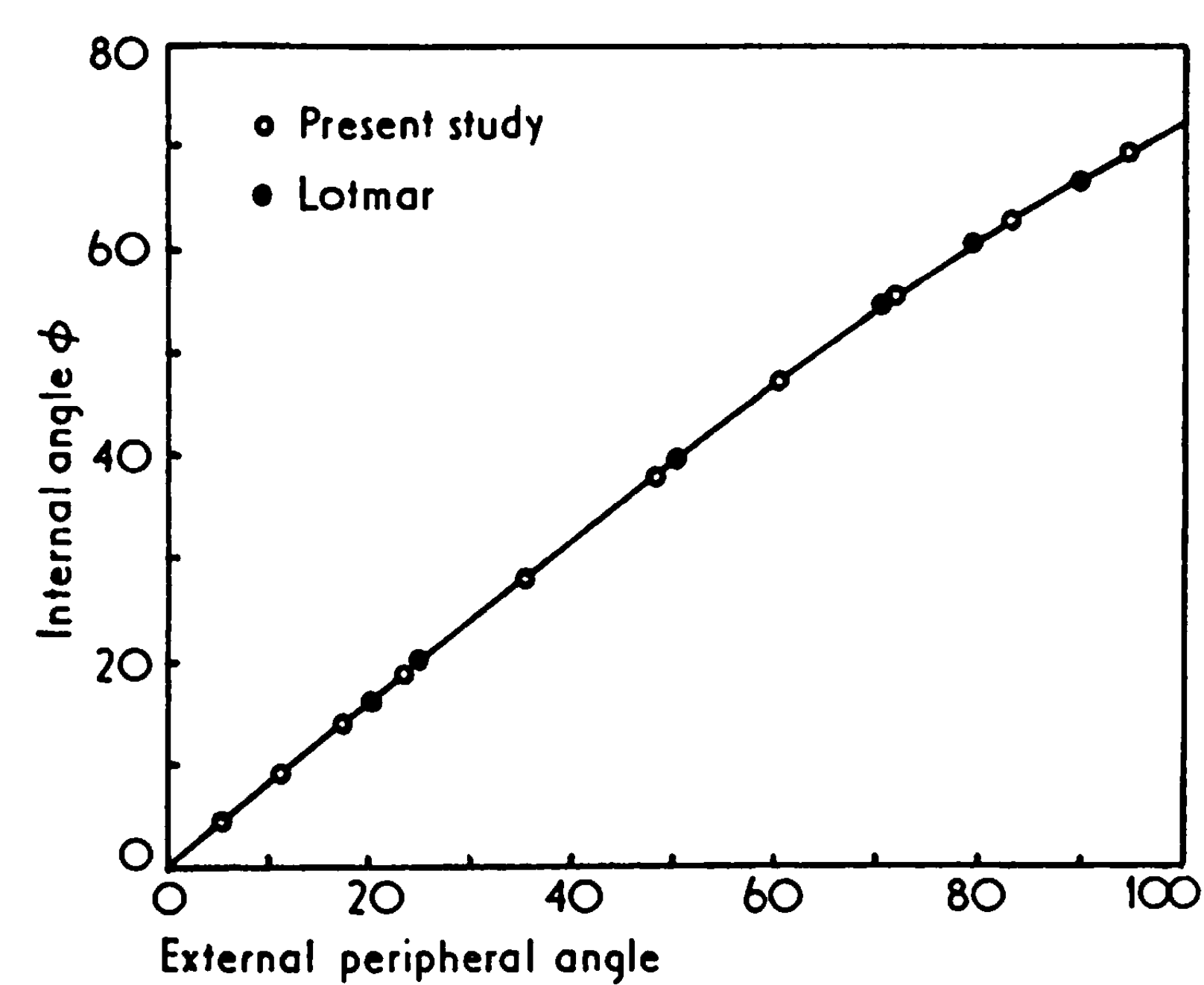
WFI and WFP are both projections on a plane surface of the retina which can be approximated to a spherical shape. However, the projection of a retinal scotoma is different in the stereographic projection used in WFI and in the azimuthal equidistant projection used for perimetry. This results in differences in the localization and quantification of scotoma.

In a first study, a simulation software was used to evaluate the errors produced by these two projection modes for the position, shape and surface area of a scotoma of circular shape and constant surface area on the retina.

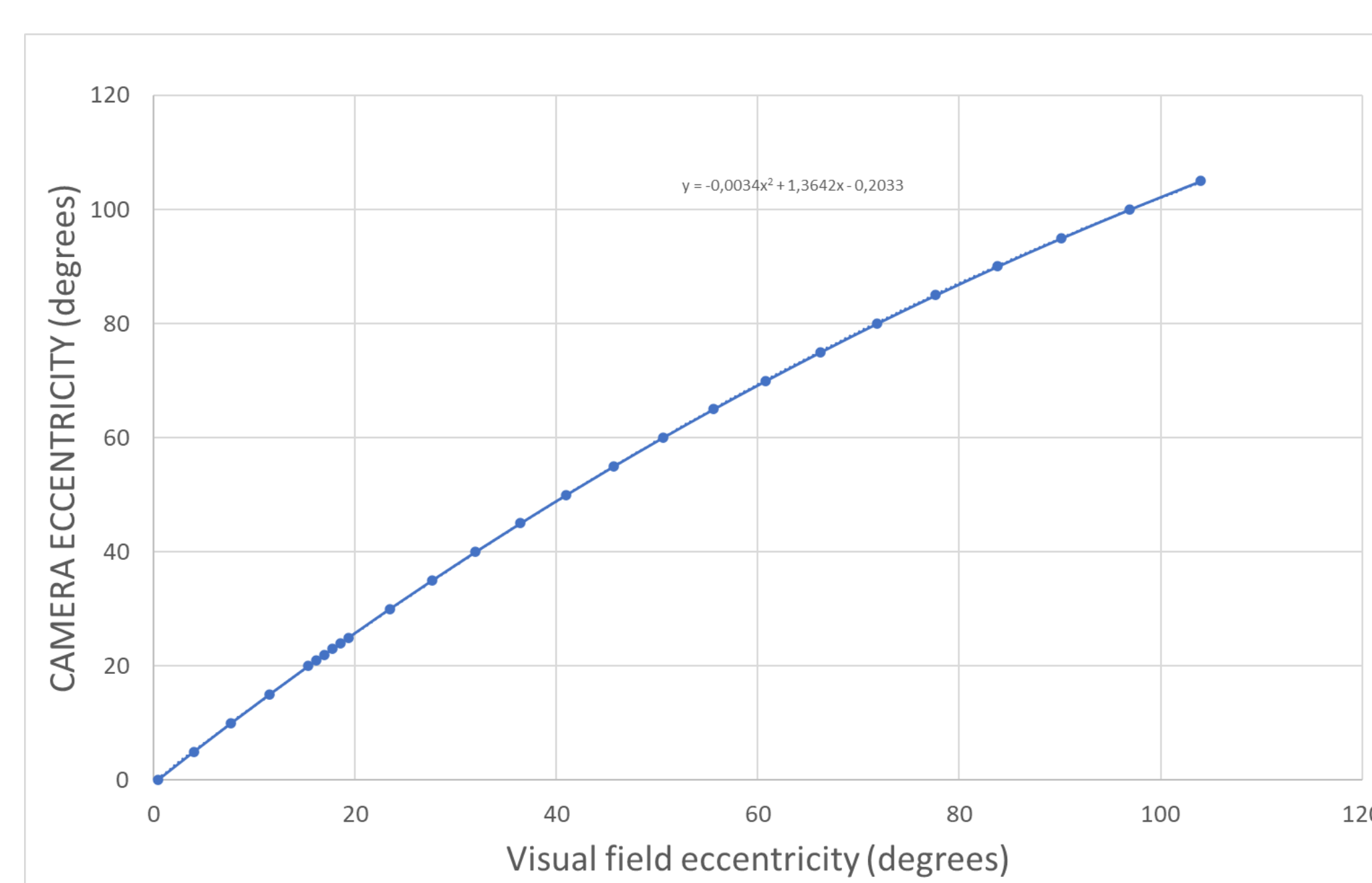
In a second study, we evaluated on 7 clinical cases with peripheral alterations the benefit of converting the representation of the WFP to WFI coordinates to allow the comparison of Goldmann perimetry results obtained with the MonCvONE perimeter (Metrovision) with wide field eye fundus images imported from OPTOS. Superposition was obtained by matching the positions of the fovea and optic disk.



Results



(DRASDO & FOWLER, 1974)



The camera angle is approximately equal to the visual angle

When eccentricity increases

- with perimetry:

the shape of scotoma is modified
their angular distance is preserved
their surface area increases

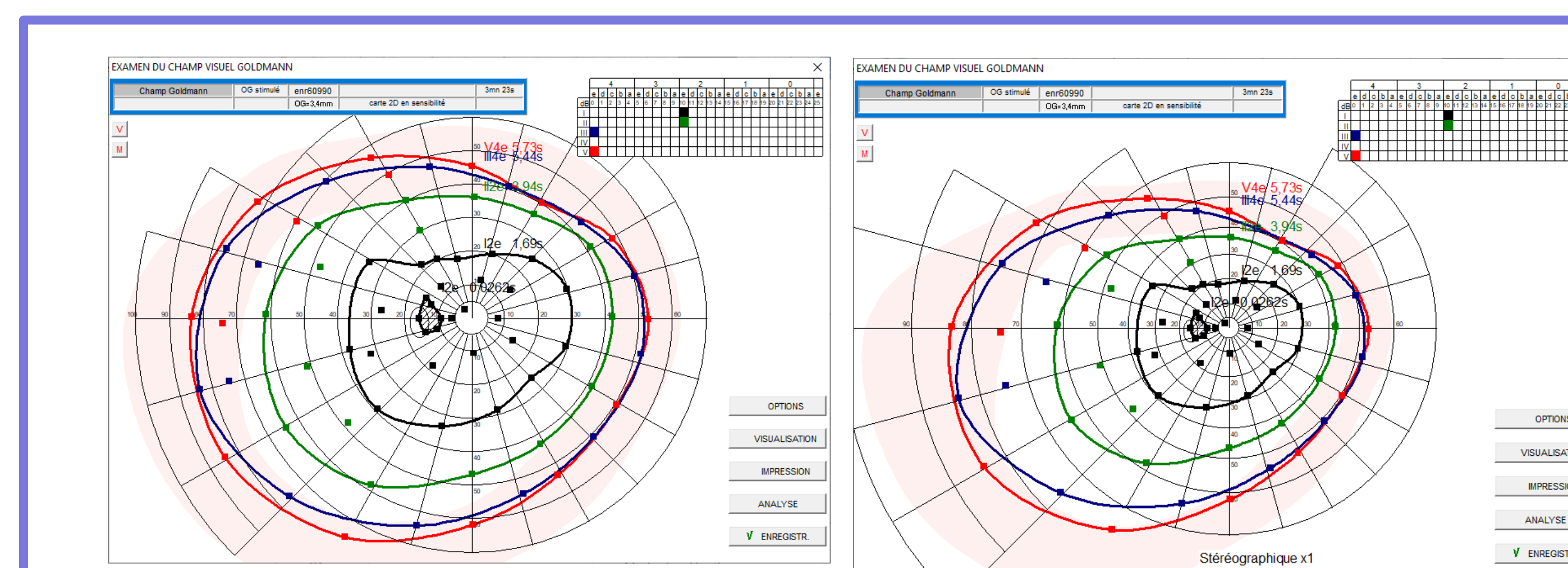
- with imaging:

the shape of the scotoma is preserved
their angular distance increases
and their surface area is largely overestimated

In order to compare perimetry and imaging data we need the same mode of representation.

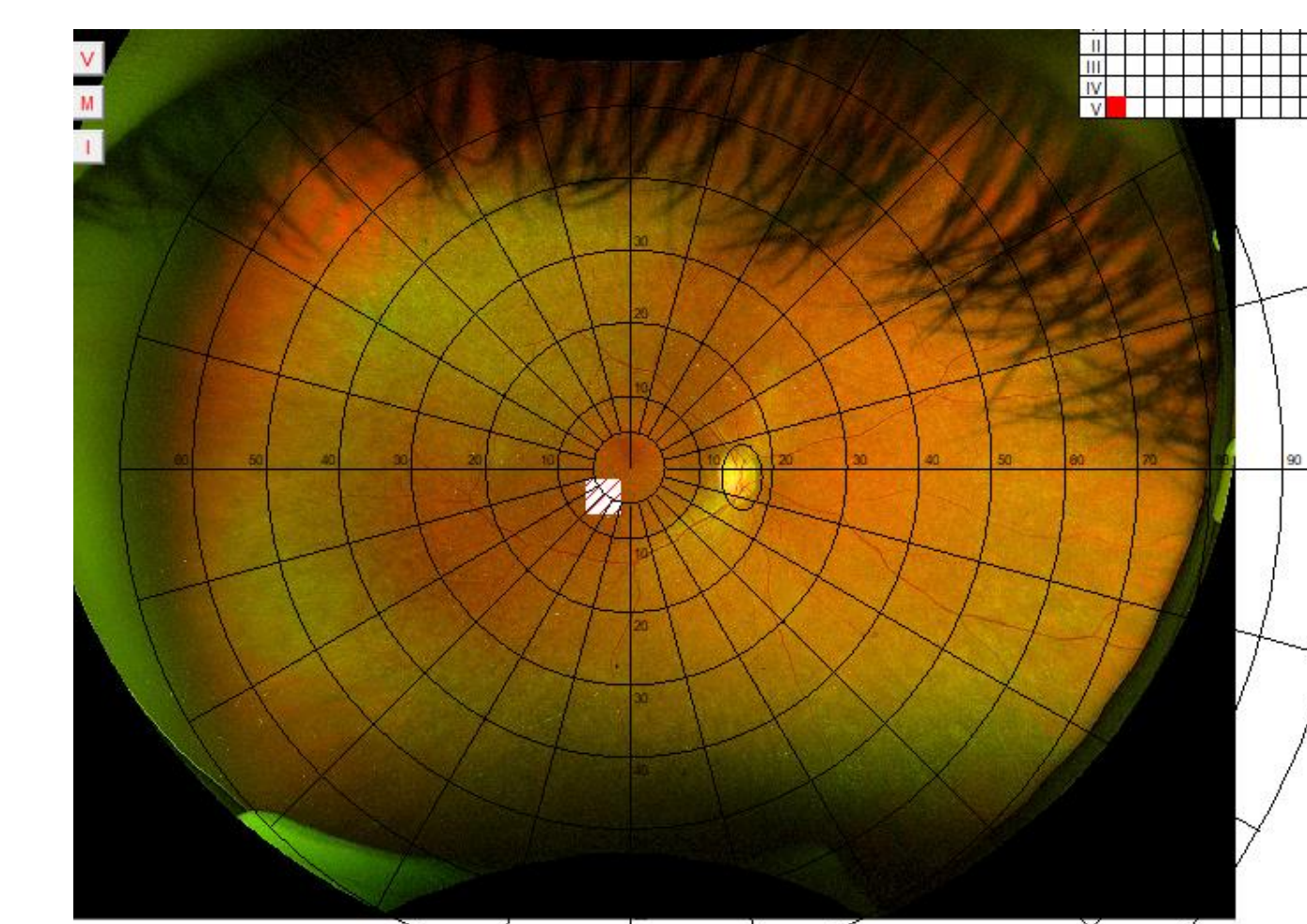
A stereographic mode for static and for kinetic perimetry results has been implemented on the ultra wide field perimeter MonCvONE.

		Azimuthal equidistant			Stereographic		
		Perimetry			Imaging		
		Azimuthal equidistant			Stereographic		
		Perimetry			Imaging		
Eccentricity (degrees)	Distance to fovea	Shape deformation	Surface area	Distance to fovea	Shape deformation	Surface area	
0	1	1	1	1	1	1	
20	1	1.02	1.02	1.03	1	1.06	
40	1	1.09	1.09	1.13	1	1.28	
60	1	1.21	1.21	1.33	1	1.78	
80	1	1.42	1.42	1.70	1	2.90	

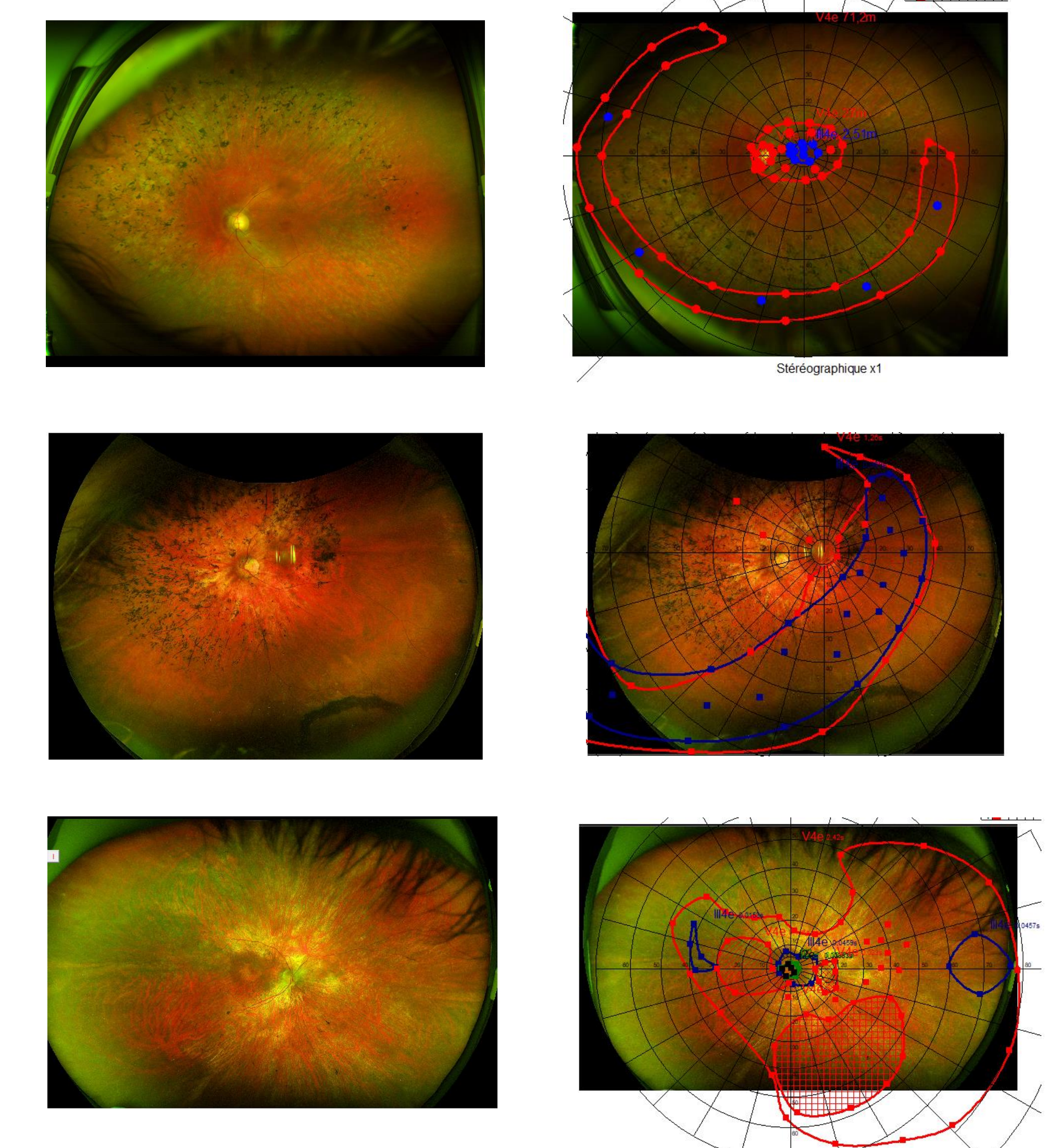


Same visual field in Goldmann and in stereographic projections

Stereographic projection of imported eye fundus image



Examples of superposition



Conclusions

The new method allows the comparison of eye fundus images and perimetry results at large eccentricities (over 20 degrees) and this is important to avoid significant errors in the position and quantification of scotoma.

Author Disclosure Block

J.R. Charlier, Metrovision P.; X. Zanlonghi, None