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OPTIMA Ophthalmic Image Analysis

Repeatability of microperimetry testing in healthy eyes compared to early/intermediate age-related macular degeneration

Hamza Mohamed, Gregor S. Reiter, Leonard M. Coulibaly, Philipp Fuchs, Ursula Schmidt-Erfurth

Department of Ophthalmology and Optometry, Medical University of Vienna, Vienna, Austria

Objective

- Microperimetry has been discussed as a **potential functional clinical endpoint.**[1]
- We examined **pointwise retinal sensitivity** of the central visual field for patients with **healthy eyes** compared to eyes with **early and intermediate AMD (e/iAMD)**
- The aim was to detect **subclinical changes** through the **test-retest repeatability** of pointwise retinal sensitivity (PWS)

Patients and Methods

40 Patients in total (20 healthy/ 20 e/iAMD) were recruited at the outpatient clinic at the Medical University of Vienna, Austria. All eyes received a pupil dilation and SD-OCT (Spectralis) examination.

The order of **two microperimetry devices** (Nidek MP3 & CenterVue MAIA) were randomized and used for two successive examinations each with a break of 10 minutes between every examination.

7200 microperimetry stimuli were acquired. Repeatability was assessed by **Bland-Altman** plots and **intraclass correlation coefficients** (ICC). A mixed effect model was calculated to evaluate PWS.

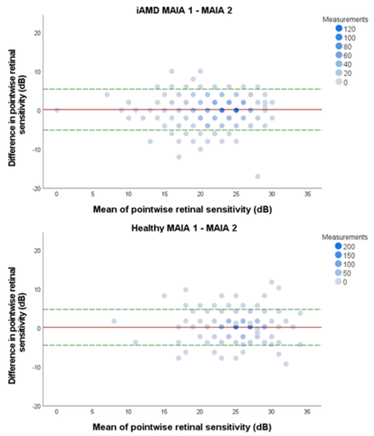
Results

Category	Healthy	AMD
Age (years)	70.2 ± 10.6	76.2 ± 6.9
Mean (± SD) PWS - MAIA (db)	25.5 ± 2.8	22.6 ± 3.7
Mean (± SD) PWS - MP3 (db)	29.2 ± 2.6	26.2 ± 3.4
CoR95 - MAIA (db)	± 4.6	± 5.2
CoR95 - MP3 (db)	± 4.4	± 4.6
ICC (MAIA - MP3)	0.68	0.75

Table 1. Demographic results.

Mixed Model	p-value (Estimate)
Age	p<0.001 (-0.07 dB/year)
Eccentricity	p<0.001 (-0.274 dB/°)
PWS (Healthy – iAMD)	p=0.497
diagnosis*excentricity	p<0.001
diagnosis*age	p=0.538

Table 2. Results from the mixed effect model.



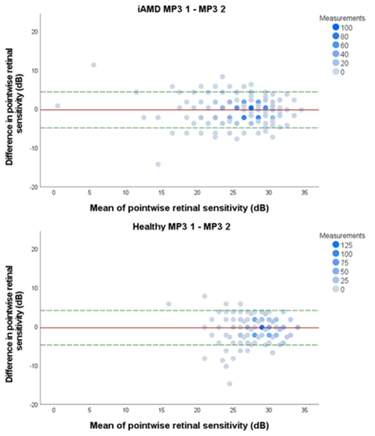


Figure 1. Bland-Altman plots showing the differences within microperimetry devices and diagnoses.

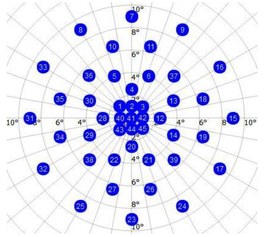


Figure 2. 45-stimuli microperimetry grid.

- The mixed model showed a significant effect for age and eccentricity.
- No significant difference between **PWS** in healthy aged eyes and iAMD could be detected.
- The interaction between **diagnosis *eccentricity** had a significant effect.

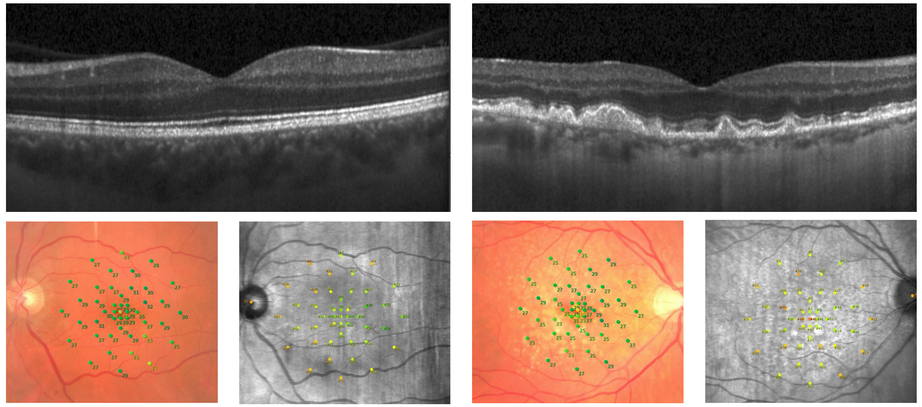


Figure 3. Example of a participant with a healthy retina

Figure 4. Example of a patient with iAMD

Conclusion

- MP3 and MAIA show an adequate test-retest repeatability for PWS
- Interdevice correlation was only moderate
- All patients had good retinal sensitivity throughout the examinations with only a trend for inferior performance in AMD indicating **no significant loss** of retinal sensitivity in early AMD stages.
- Test-retest repeatability was equal for healthy eyes compared to early to intermediate AMD

References:

1. Cassels NK, Wild JM, Margrain TH, Chong V, Acton JH. The use of microperimetry in assessing visual function in age-related macular degeneration. Surv Ophthalmol. 2018;63(1):40-55. doi:10.1016/J.SURVOPHTHAL.2017.05.007