Repeatability of home-based visual field testing using a virtual reality perimeter

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Purpose

- To evaluate the compliance with the testing and repeatability of VisuALL H head-mounted perimeter (Olleyes Inc. Summit, NJ) which is a home-based virtual perimeter.

Methods

- This prospective study included 16 patients (32 eyes) with open-angle glaucoma from the glaucoma services of Wills Eye Hospital and from the University of Alabama at Birmingham
- Patients were provided with a VisuALL H perimeter (**Figure 1**), received remote training, and were tasked with performing four 24-2 tests in four weeks.
- Compliance with the testing regimen was calculated as the number of tests completed over the total number of tests prescribed (n = 64), expressed in percent.
- The repeatability was assessed by determining the intra-class correlation coefficient (ICC) between the mean deviation (MD), pattern standard deviation (PSD), and global and quadrants mean sensitivity values of the first three tests.
- ICC values below 0.40 indicate poor reliability, values between 0.40 and 0.59 indicate fair reliability, values between 0.60 and 0.74 indicate good reliability, and values between 0.75 – 1.0 indicate excellent reliability.

Results

- The demographics of the patients are presented in **Table 1.**
- 76% of the patients (13/17) had perfect adherence to the testing regimen. Two patients (12%) took no tests. Of the 68 tests prescribed, 56 were taken (82.4%).
- The results of ICCs are presented in **Table 2**.

Table 1. Demographics and severity of the visual filed of the patients.

	N (%)
Gender (Female)	8 (50)
Race (White)	13 (81)
Visual field severity	N (%) of eyes
Mild	19 (59)
Moderate	8 (25)
Severe	5 (16)
	Mean ± SD
Age (years)	58 ± 10

Figure 1. The components of the virtual reality platform, VisuALL H.

Table 2. The inter-class correlation coefficient of mean deviation, pattern standard deviation, and mean sensitivity values.

	Test 1	Test 2	Test 3	ICC	95% Confidence interval		P-value
					Lower bound	Upper bound	
MD (dB)	-2.58	-2.36	-2.47	0.92	0.83	0.95	< 0.001
PSD (dB	6.34	6.22	6.15	0.94	0.89	0.97	< 0.001
Global MS (dB)	28.14	28.27	28.35	0.91	0.81	0.95	< 0.001
Supero-nasal MS (dB)	26.92	26.73	26.68	0.90	0.82	0.95	< 0.001
Supero-temporal MS (dB)	27.67	27.92	28.05	0.85	0.70	0.91	< 0.001
Infero-temporal MS (dB)	29.66	29.78	29.85	0.83	0.68	0.90	< 0.001
Infero-nasal MS (dB)	28.47	28.82	29.01	0.94	0.79	0.94	< 0.001
Central MS (dB)	28.51	28.16	28.79	0.91	0.74	0.92	< 0.001
Peripheral MS (dB)	28.03	28.30	28.22	0.89	0.78	0.93	< 0.001

Conclusions

- Prior studies have reported 69-95% compliance with the home perimetry, consistent with ours(82%).
- The test-retest reliability of the mean deviation, pattern standard deviation, and mean sensitivity values were excellent.
- Home-based monitoring of visual filed has the potential of remote glaucoma functional testing.

References

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