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Repeatability and reproducibility in the clinical evaluation of ocular motility with commonly used tests

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PURPOSE

To determine the repeatability and reproducibility on the results of different test for assessing saccades and pursuits movements. These parameters allow us to know if a test is reliable enough for clinical use.

1. INTRODUCTION

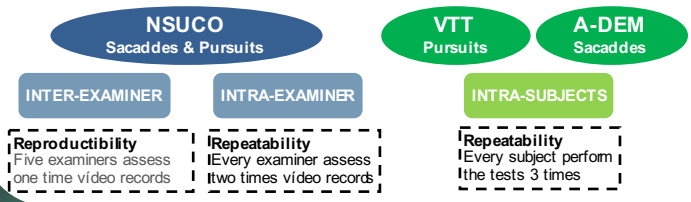
•Eye movements allow following a moving object, reading a text or changing the attention from one point to another inside of the visual field. It is necessary that these movements are accurate otherwise they may induce a poor visual performance.

•To clinically study the quality of these eye movements, we need accurate and reliable tests and discriminative results that allow the examiner properly qualify execution.

•For the correct interpretation of the results of any visual exam it is necessary to know their reliability. This reliability can be determined studying the effect induced by the examiner and the subject.

2. METHODS

A sample of 42 young subjects, aged between 18 and 25 years old (mean±deviation)(21.42±1.89) were evaluated. All subjects of the sample passed inclusion criteria. Saccades and pursuits movements were evaluated by the NSUCO (Northeastern State University College of Optometry test) and the results were video recorded. VTT-Groffman (Visual Tracing test) was used for monitoring small pursuits and the ADEM (Adult Developmental Eye Movement test) was used for small amplitude saccades.



3. NSUCO RESULTS

INTER-EXAMINER

Saccades results for NSUCO test are showed in table 1 and pursuits results in table 2. The maximum score for the test was 15 points for both. The ANOVA analysis showed statistical differences between examiners (p<0.01). Two o more points of difference between examiner was considered as clinical disagreement (red cross in the tables).

SACADICS	Examiner 1	Examiner 2	Examiner 3	Examiner 4	Examiner 5
Examiner 1		✓	✓	✓	✓
Examiner 2			✓	✓	✗
Examiner 3				✓	✗
Examiner 4					✓

Table 1: Saccadic results for NSUCO test.

PURSUITS	Examiner 1	Examiner 2	Examiner 3	Examiner 4	Examiner 5
Examiner 1		✓	✓	✓	✗
Examiner 2			✗	✗	✓
Examiner 3				✓	✗
Examiner 4					✗

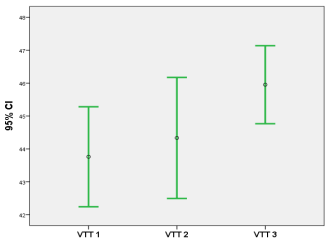
Table 2: Pursuits results for NSUCO test.

INTRA-EXAMINER

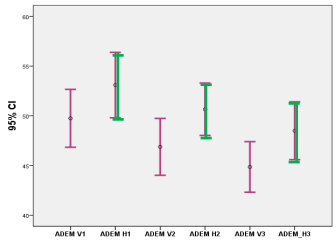
Each of the examiners assessed the NSUCO test records for saccadics and pursuits on two separate sessions. It were not found statistically significant differences (p = 0.37) neither clinical.

4. VTT-GROFFMAN & A-DEM RESULTS

Pursuits results for VTT-Groffman test are showed in graphic 1. The maximum score for the test was 50 points. The ANOVA analysis did not show statistical differences between three repetitions (p<0.17).
Small saccades results for A-DEM test are showed in graphic 2 and table 3. There are significant differences for vertical and horizontal times (p <0.01). Both times with each performance decrease. This suggests a learning effect.



Graphic 1: Score of VVT for 3 sessions



Graphic 2: Score of A-DEM for 3

		Trial 1 vs 2	Trial 2 vs 3	Trial 1 vs 3
Vertical time (s)	Mean	2.86 (p < 0.01)	2.02 (p < 0.01)	4.89 (p < 0.01)
	R Pearson	0.95 (p <0.01)	0.94 (p < 0.01)	0.90 (p < 0.01)
Horizontal time (s)	Mean	2.43 (p = 0.03)	2.16 (p < 0.01)	4.597 (p < 0.01
	R Pearson	0.90 (p < 0.01)	0.81 (p < 0.01)	0.90 (p < 0.01)
Ratio	Mean	0 (p= 1)	-0.01 (p = 0.74)	-0.01 (p = 0.46
	R Pearson	0.17 (p = 0.29)	-0.06 (p = 0.69)	0.01 (p = 0.94)

Table 3: Mean differences and correlations between sessions for A-DEM, vertical, horizontal and ratio results.

6. BIBLIOGRAPHY

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5. CONCLUSIONS

The usual clinical test for ocular motility do not show in all cases a good repeatability. This lead us to propose that are necessary to reach the design of new evaluation strategies that do not depend on the observer and without whose learning effect is known and valued.

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