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EFFECT OF STIMULUS CHARACTERISTICS ON SACCADIC AND PURSUIT MOVEMENTS

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PURPOSE

To study the effect of different stimulus characteristics on saccadic (amplitude and size) and pursuit (amplitude and size) movements measured with an eye-tracker, in order to advance in the development of its objective assessment in clinic.

1 - INTRODUCTION

•The saccadic movements are the fastest ocular movements which allow to change the gaze position quickly to move the image of our object of interest towards the fovea.

•Smooth pursuit movements allow to follow objects in movement combining soft movements and small saccadic intrusions. Their main function is to stabilize the image of the object on the fovea to keep a good visual acuity.

•In ocular movements examination exist a high variability of stimulus characteristics, like different size and amplitude positions [1].

•The different characteristics in ocular movements have been defined as:

•**Accuracy:** : Difference between the average gaze position and the real position of the stimuli, calculated in degrees of visual angle in saccades and with root mean square (rms) in pursuits movements.

•**Latency:** Reaction time since the stimulus appearance and the beginning of eye movement, normal values are 200 ms in saccades [2] and 100 ms pursuits [3].

•**Number of saccadics:** number of saccades made during eye movement examination.

3 - SACADIC MOVEMENTS RESULTS

		Accuracy (º) p>0,05	Latency (ms) p>0,05	Number of saccades p>0,05
Amplitude (º)	9	0.34 ± 0.11	96.96 ± 35.90	2.13 ± 0.44
	22	0.31 ± 0.11	122.77 ± 36.87	2.29 ± 0.22
Stimulus size (logMAR)	0,5	0.40 ± 0.18	104.79 ± 31.02	2.30 ± 0.24
	0,8	0.35 ± 0.15	117.36 ± 50.30	2.36 ± 0.30

Table 1: Saccadic accuracy, latency and number of saccadics (mean and standard deviation) for different stimulus amplitude and size (p corresponds to ANOVA significance)
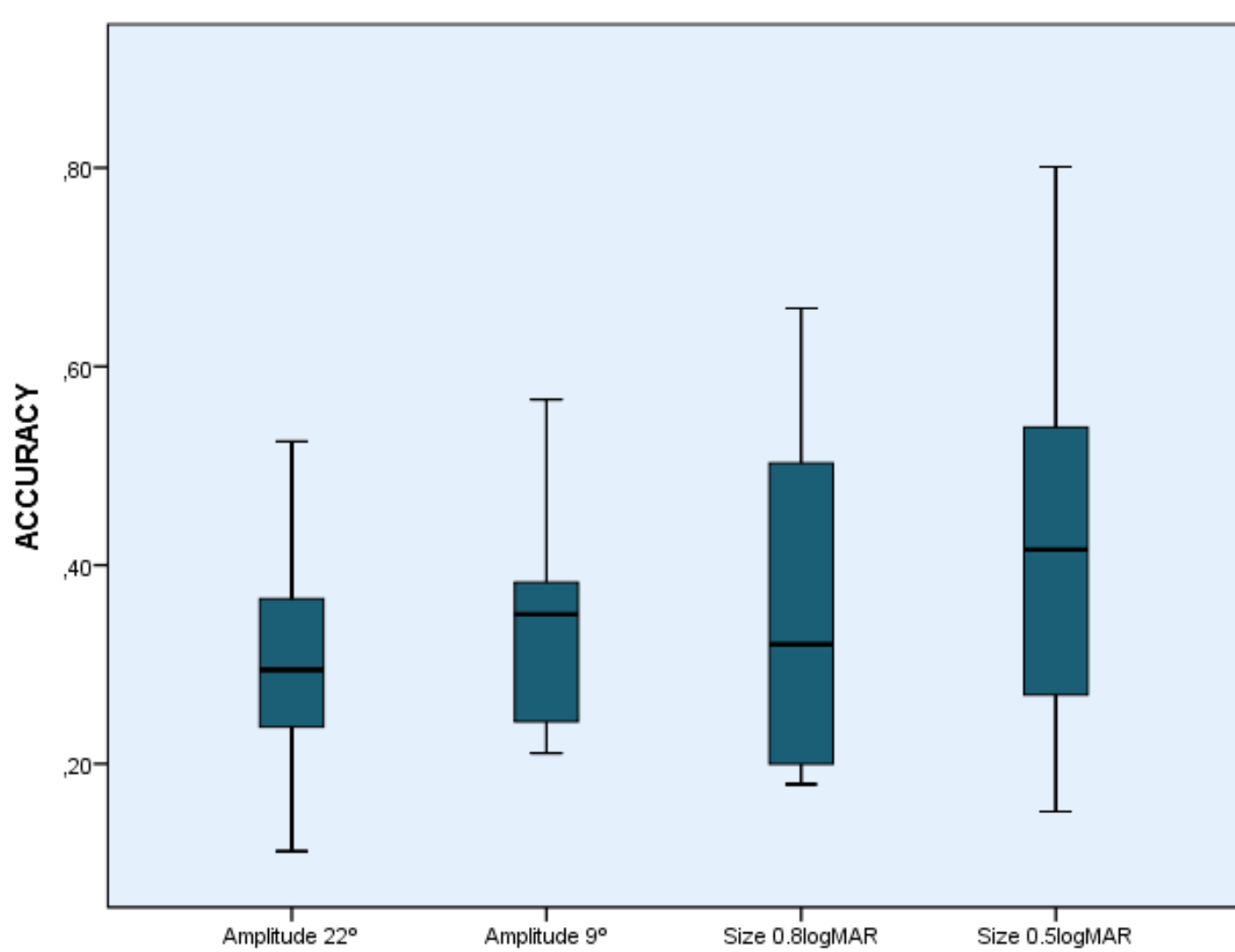
Graphic 1: Accuracy values in function of stimulus amplitude<e and size.
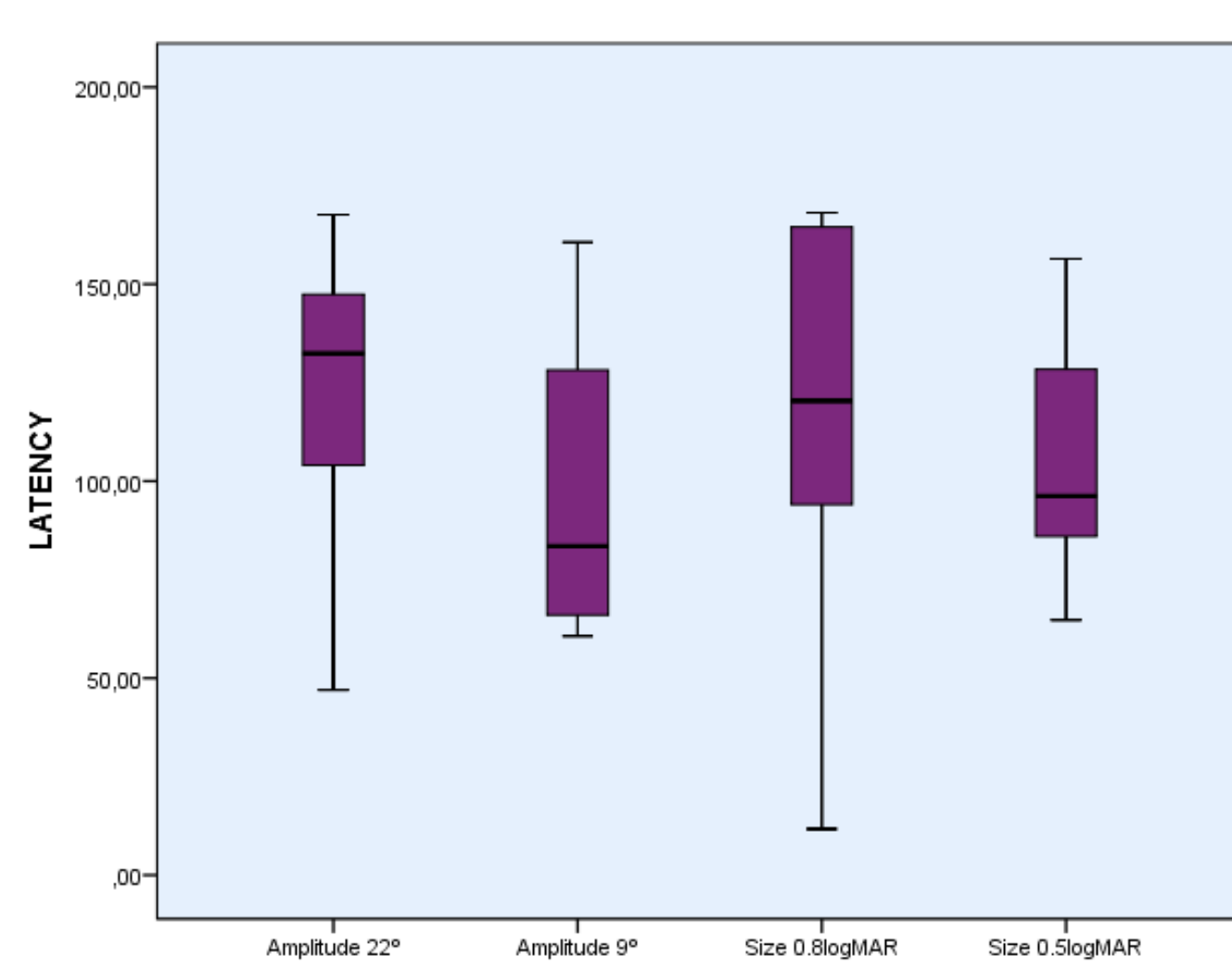
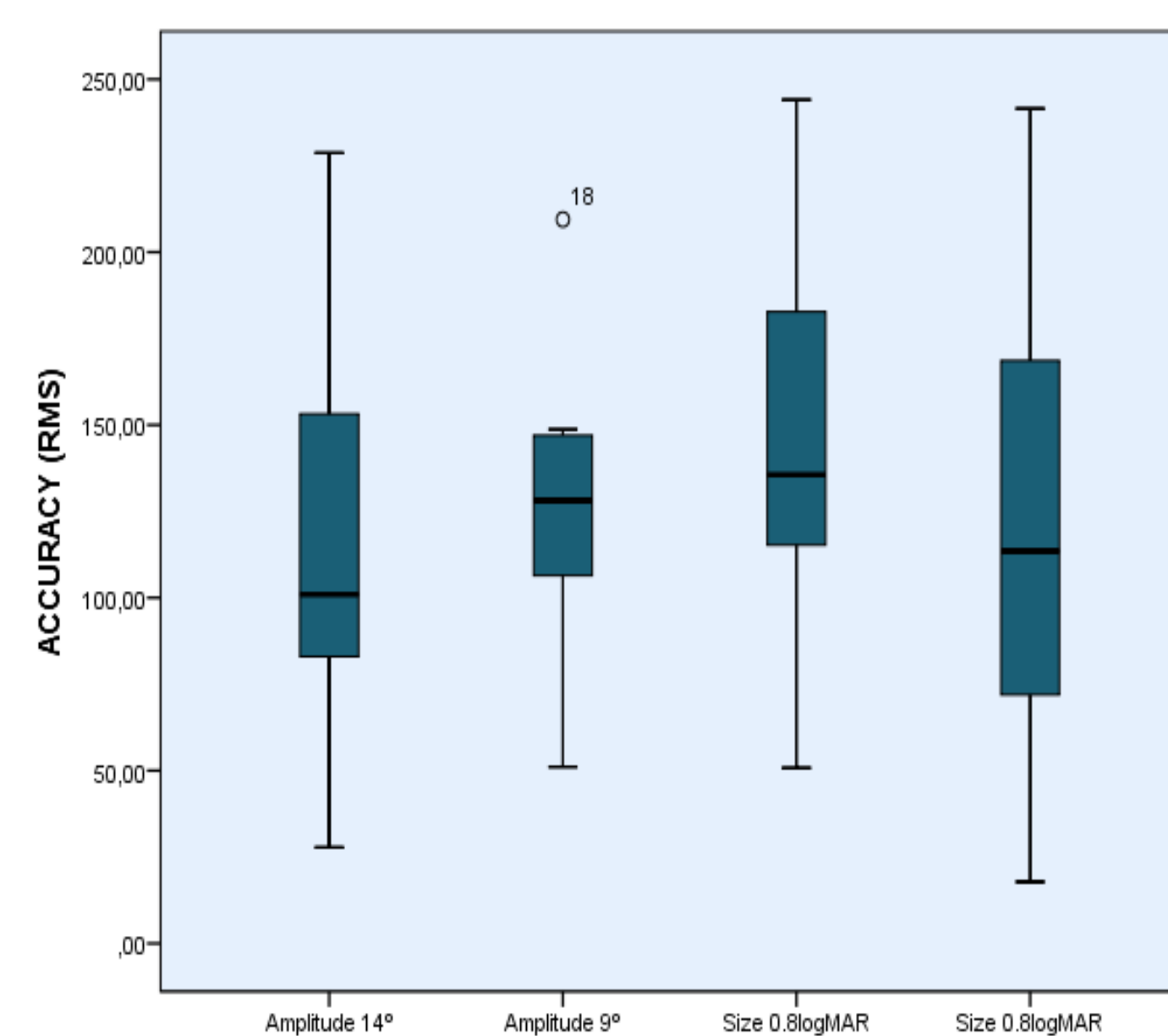Graphic 2: Latency values in function of stimulus amplitude and size.

2 - METHODS

• **Samle**: Ten patients, with mean age of 22.3±1.4, participated in the study.
• **Instrument**: The ocular motility was recorded with the EyeLink1000 plus eye-tracker. Saccadic and pursuit movements were examined.
• In saccadic movement examination the effect of the amplitude (22º and 9º) of the induced saccade and the size of the stimulus (0.5 and 0.8 logMAR) were studied. For this purpose, the accuracy, latency and number of saccades were calculated.
• In pursuit movement examination the effect of the induced amplitude (14º and 9º) and size of stimulus (0.5 and 0.8 logMAR) were studied. For this purpose, the accuracy (rms), latency and number of saccades during the pursuit movements were calculated.
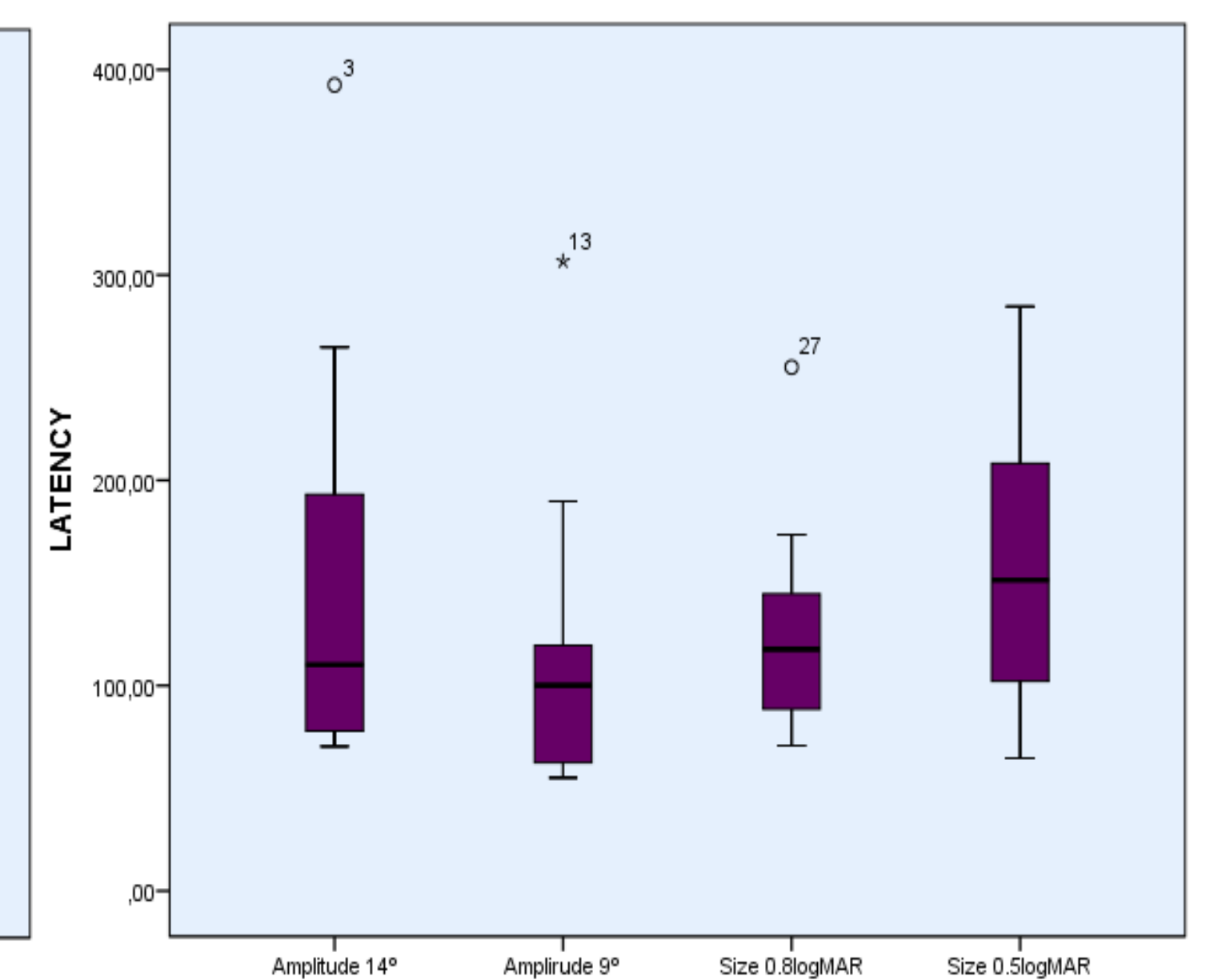
4 - PURSUIT MOVEMENTS RESULTS

		Accuracy (RMS) p>0,05	Latency (ms) p>0,05	Number of saccades p>0,05
Amplitude (º)	9	127.18 ± 40.93	117.45 ± 77.43	34.52 ± 11.75
	14	112.07 ± 62.60	157.69 ± 104.16	35.85 ± 11.75
Stimulus size (logMAR)	0,5	119.87 ± 65.51	158.55 ± 73.71	37.85 ± 11.58
	0,8	143.31 ± 52.02	128.30 ± 55.40	36.87 ± 11.70

Table 2: Smooth pursuits accuracy, latency and number of saccadics (mean and standard deviation) for different stimulus amplitude and size (p corresponds to ANOVA significance)

Graphic 3: Accuracy values in function of stimulus amplitude and size.

Graphic 4: Latency values in function of stimulus amplitude and size.

5 - CONCLUSIONS

• The stimulus characteristics can influence both saccadic and pursuit movements. But we do not found statistically significant differences.
• In saccades movements we observed that there are not differences in accuracy and number of saccades, but the latency is faster when the amplitude is longer and the stimuli size is bigger.
• In smooth pursuit movements we observed that there are not differences in accuracy and number of saccades, but the latency is higher when the amplitude is longer and the stimuli size is smaller.
• Further work is need to determine the optimal stimulus conditions in clinic and the sample could be increased.

6 - BIBLIOGRAPHY

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