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Impact of Osteopathy on Smooth Pursuit Eye Movements in Healthy Adults

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Introduction

1. The idea that osteopathic manipulative treatments (OMTs) should have an impact on the human visual system is not new (Bilgeri, 2006^[1]; Sandhouse et al., 2006^[2]).
2. This hypothesis is based on the restoration of the fascial system elasticity (i.e., the connective tissue enclosing all our organs, including the eyes) by OMTs (Bordoni & Zanier, 2014^[3]).
3. However, to date, there is no empirical evidence to support this hypothesis.
 - ➔ We conducted a randomized, double-blind, controlled study to evaluate the effect of an OMT on smooth pursuit in healthy young adults.

Methods

Participants :

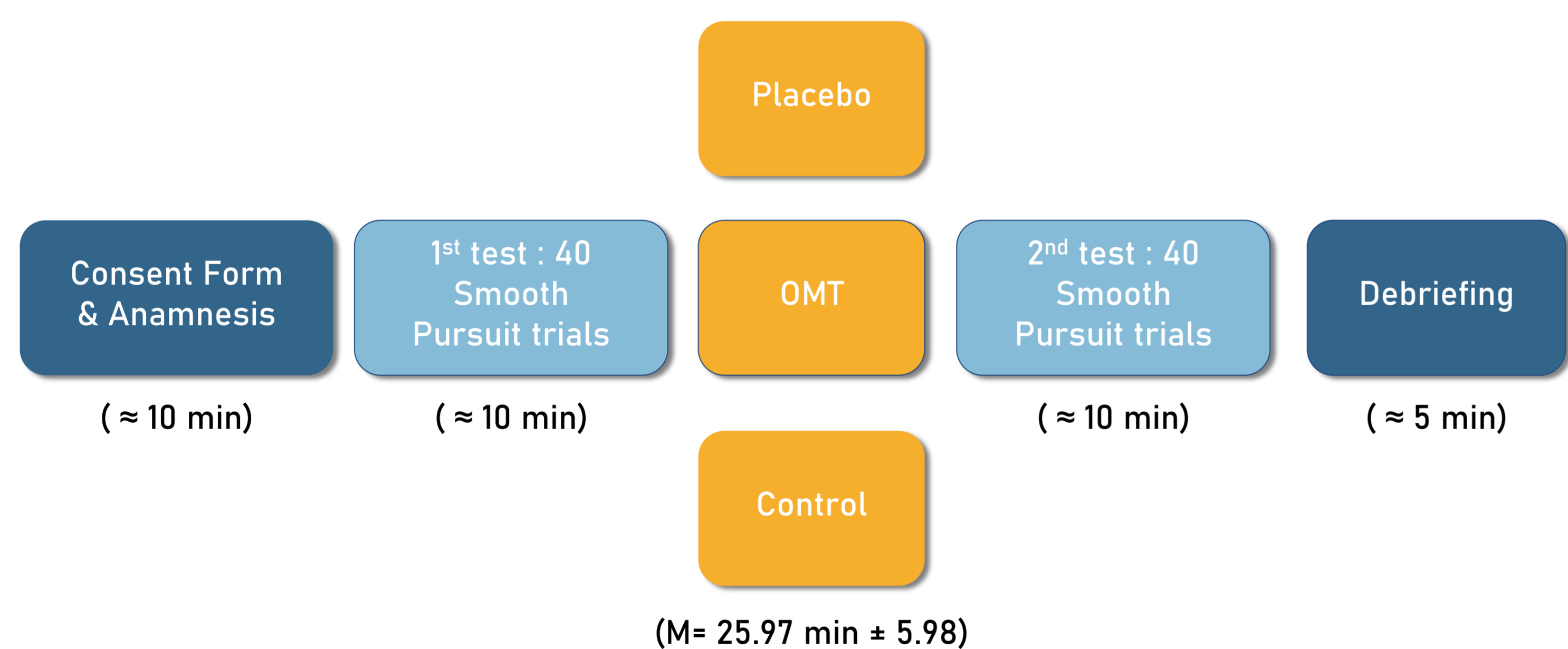
122 participants were enrolled, 28 were excluded (because of calibration failure, age criteria, or delays in appointments). Thus, 94 (M = 19.60 ± 1.67 years; 83 females) were randomly allocated to three groups :

- OMT: received an experimental treatment (N = 32).
- Placebo: received a sham treatment (N = 34).
- Control: discussed with the practitioner without being touched (N = 38).

Stimuli/Material :

- Horizontal displacement of a black circle target (1° in diameter) at a constant velocity (20°/sec).
- Smooth pursuit eye movements were recorded with an Eyelink 1000 (SR Research®).

Procedure :



Pre-registered outcomes:

- Smooth pursuit duration, i.e., time spent to track a moving target without saccades, in ms.
- Latency, i.e., time elapsed between target onset displacement and ocular pursuit initiation, in ms.
- Score on the manual test of passive eyeball mobilization. Tissue elasticity of the oculomotor muscles was assessed using a 3-point scale (1 = no resistance to the mobilization, 3 = strong resistance). Four muscles (two per eyeball) were assessed.

Conclusion

- In all groups, smooth pursuit duration increased and latency decreased between the two tests.
- Nevertheless there was no greater improvement in smooth pursuit for the OMT group as compared to the other two groups.

These preliminary results confirmed that procedural learning of smooth pursuit occurs within 40 trials, but failed to support the hypothesis of smooth pursuit enhancement by OMTs.

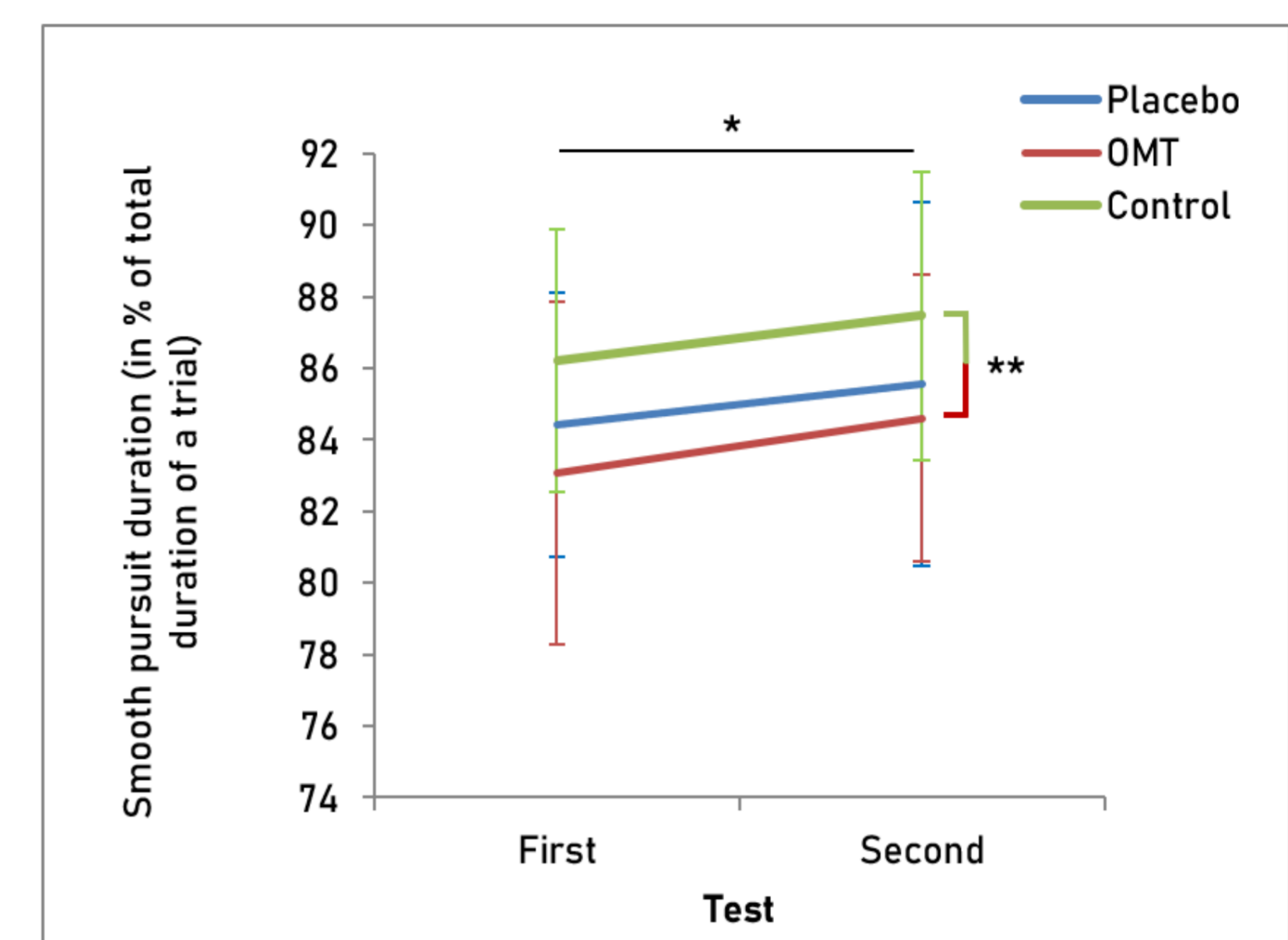
➔ More participants are needed to reach the expected power of 0.8. Then, if the interaction Group x Test is still not significant, further studies should focus on elderly volunteers or populations with oculomotor disorders.

References

- ¹ Bilgeri, S. (2006). The Impact of osteopathic treatment on increased intraocular pressure in primary chronic open-angle glaucoma (Doctoral dissertation, Thesis. Master of Science. *Danube University Krems/Vienna School of Osteopathy*).
- ² Sandhouse, M. E., Shechtman, D., Fecho, G., & Timoshkin, E. M. (2016). Effect of osteopathic cranial manipulative medicine on visual function. *Journal of Osteopathic Medicine*, 116(11), 706-714.
- ³ Bordoni, B., & Zanier, E. (2014). Clinical and symptomatological reflections: the fascial system. *Journal of Multidisciplinary Healthcare*, 7, 401.

Results

Smooth Pursuit Duration

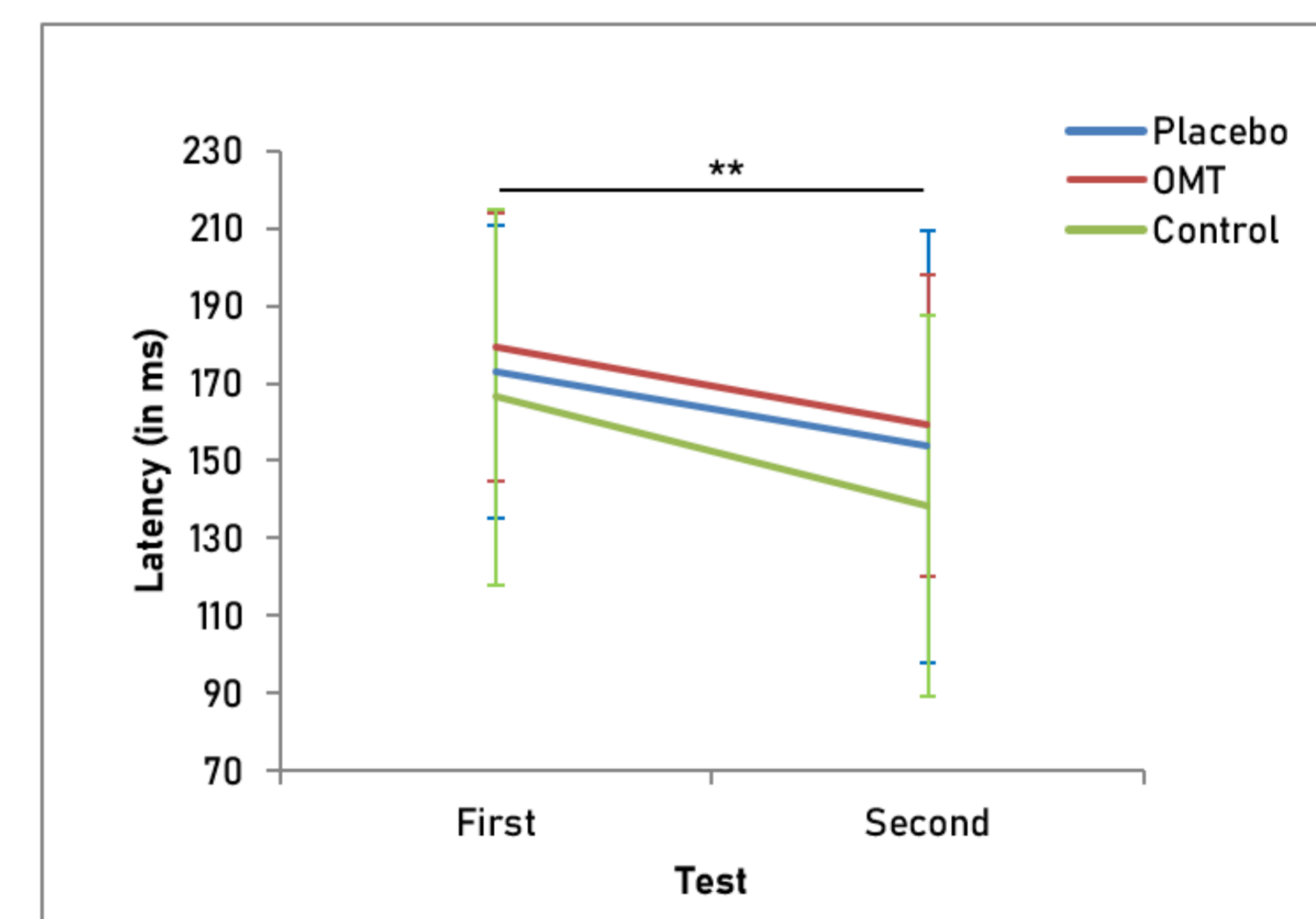


A. In all groups, smooth pursuit duration increased between the two tests ($F(1,88) = 10.2, p = .002$).

B. There was a main effect of Group ($F(1,88) = 4.6, p = .012$). Post-hoc analyses showed a difference between the control group and the OMT group ($F(1,88) = 8.7, p = .016$). But this difference between groups was observed from the first test.

C. There was no Group x Test interaction ($F(1,88) = .04, p = .96$).

Latency



A. In all groups, smooth pursuit latency decreased between the two tests ($F(1,88) = 34.3, p < .001$).

B. There was no Group x Test interaction ($F(1,88) = .71, p = .50$).

Score on the manual test of eyeball passive mobilization

No correlation was observed between scores on the first manual test and smooth pursuit duration ($r = -0.05; p = 0.644$) measured in the first oculomotor test.

Additional analyses

- Velocity of anticipative Smooth Pursuit (in °/sec) : No Group x Test interaction ($F(1,88) = .02, p = .98$).
- Smooth Pursuit Gain : No Group x Test interaction ($F(1,88) = .60, p = .55$).

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This work has been pre-registered on Clinicals Trials :

<https://clinicaltrials.gov/ct2/show/study/NCT05018390?draw=2>

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