

The agreeability of pupil size measurements of different optical biometers and dynamic pupillometer



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Introduction

Dynamic pupil responses, in addition to a random measure of static pupil size, play a critical role not only in the impact on the visual performance of MFSCl and OrthoK treatments, but likely in the long-term myopia-controlling efficacy of those treatments as well. This self-controlled study aimed to investigate the agreeability between different instruments used in clinical practice to measure static pupil size and dynamic pupil response.

Methods

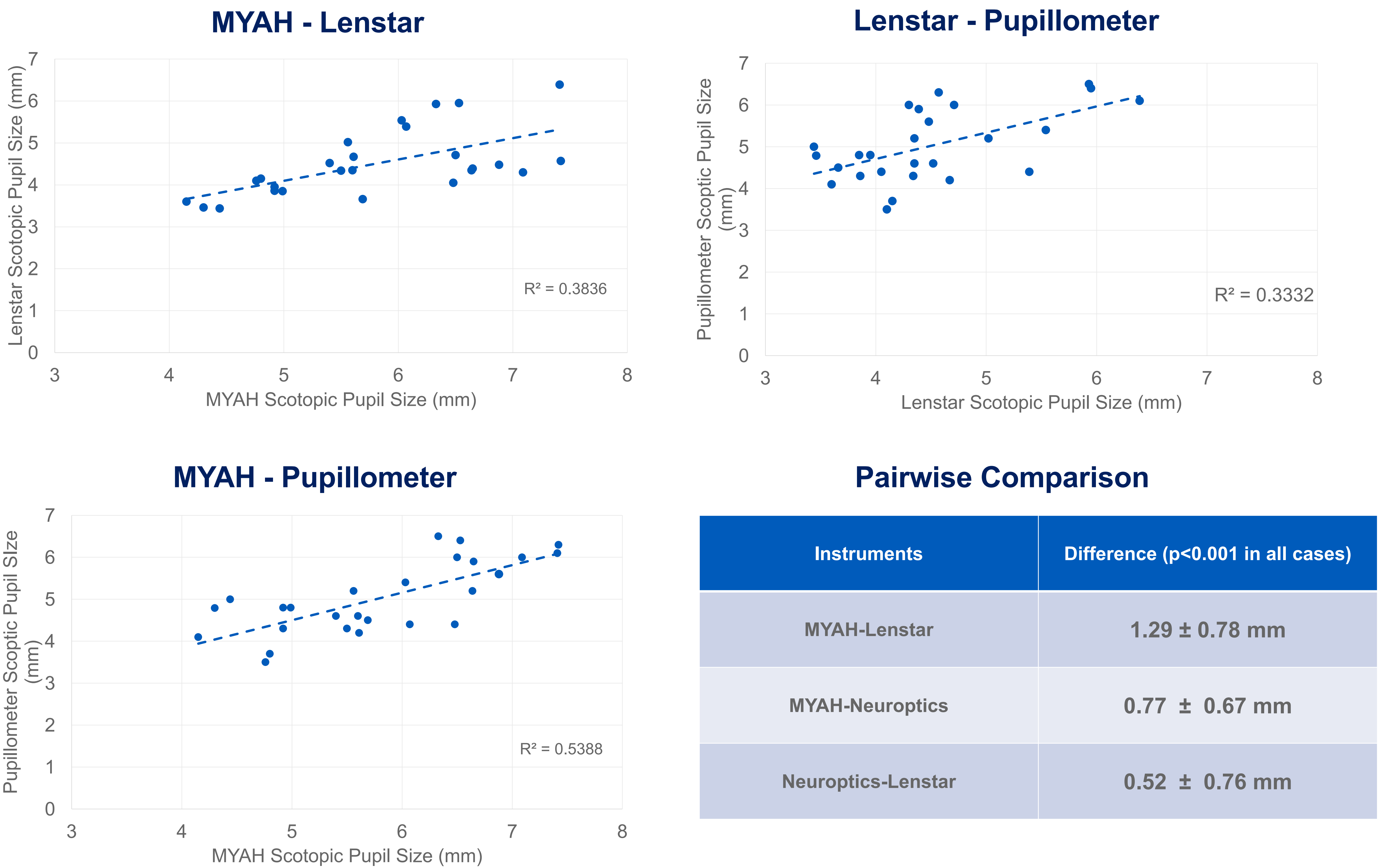
- n = 26 eyes of 13 individuals (12 female, 1 male)
- Average age = 25.6 ± 6.1 years (min = 22, max = 44)

Pupil size measurements were measured on the following instruments in a controlled environment with consistent lighting conditions (contralateral eye unpatched)

- Haag-Streit LenStar LS900® static pupil size
- Topcon MYAH dynamic pupillometry
- Neuroptics® PLR™-3000 dynamic pupillometry



Agreeability of Static Pupil Size Measurement among Three Instruments



Dynamic Pupil Response between MYAH vs. Neuroptics PLR™-3000

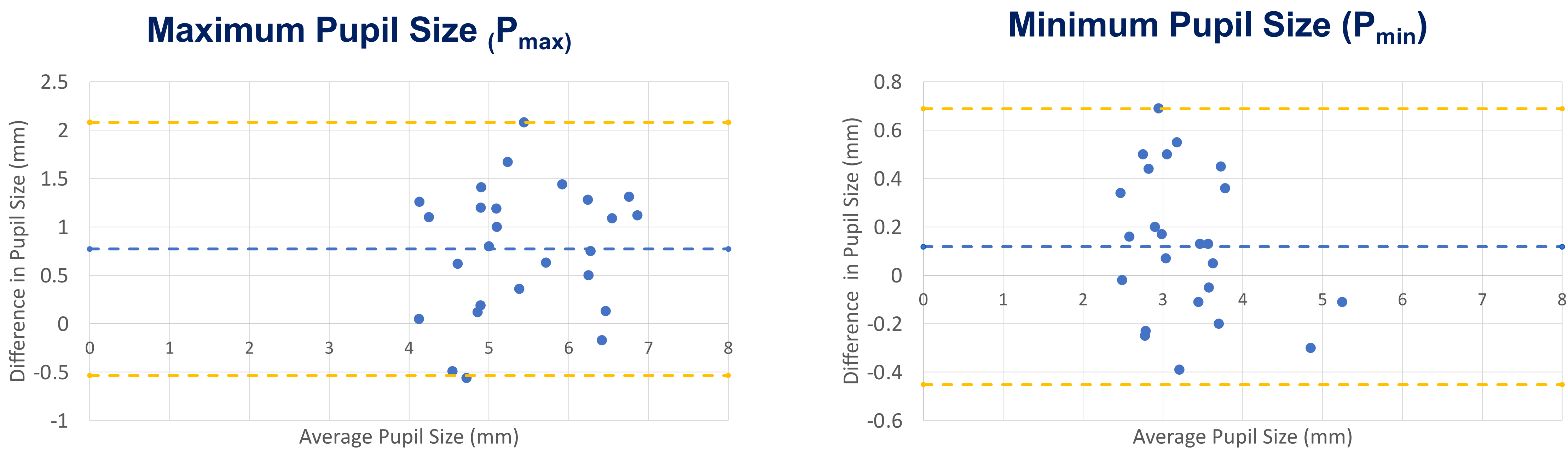


Figure 1. Bland-Altman plots comparing the agreeability of the dynamic pupillometry of the MYAH and Neuroptics Pupillometer.

Conclusion

- Clinically significant inter-instrument variability
- Static pupil size MYAH > Neuroptics > Lenstar LS 900
- MYAH generated larger P_{max} and P_{min} than Neuroptics in dynamic pupil response

Discussion

Pupil response to low-dose atropine (LDA) has been proposed as a biomarker for the topical bioavailability of the eyedrop in varying formulation. Similarly, pupil size and angle Kappa also play critical role in the impact of MFCL and OrthoK on visual performance. Furthermore, one of the proposed mechanism of the potential synergistic effect between LDA and optical interventions for myopia control is related to the interaction of the change of pupil response induced by LDA and the imposed defocus by MFCL or OrthoK.

The preliminary results of this study clearly demonstrated that there was **poor agreeability in pupil size measurements** with the different instruments. Future studies are warranted to better understand the source of disagreeabilty such as intensity and duration of the light sources used in each instrument, the impact of patching the untested eye, as well as the variability with repeated measurements. to better understand its research and clinical implications on myopia management.

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