

Train Like an Athlete: Quantifying Surgeon Physiology During New Skill Acquisition



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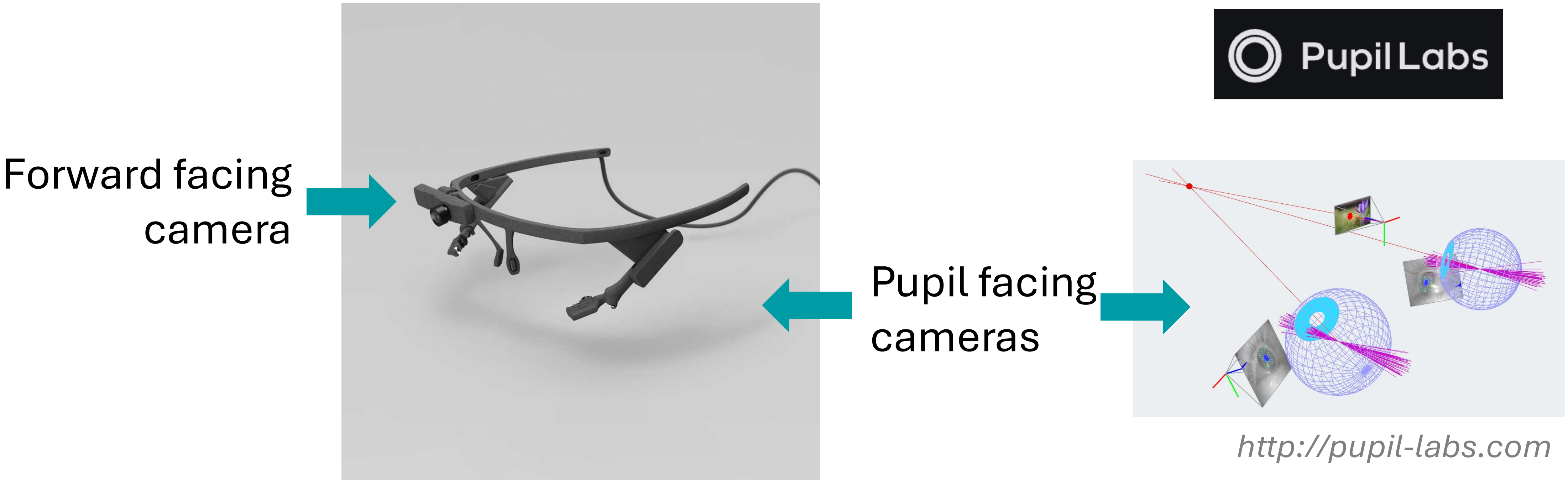
Background

- **Mastering** minimally invasive cardiac surgical procedures demands the development of **new technical skills**, often facilitated through **simulation**.
- **Pupil size** has been previously shown to correlate with **cognitive load**.

We hypothesized that tracking pupil size during surgical simulation could offer quantitative insights to optimize the efficiency of skill acquisition.

Methods

- End-to-end Dacron graft (27mm) anastomosis performed through a 3x3” simulated thoracotomy incision.
- Headset worn to track and measure each pupil diameter at 200 Hz.



Results

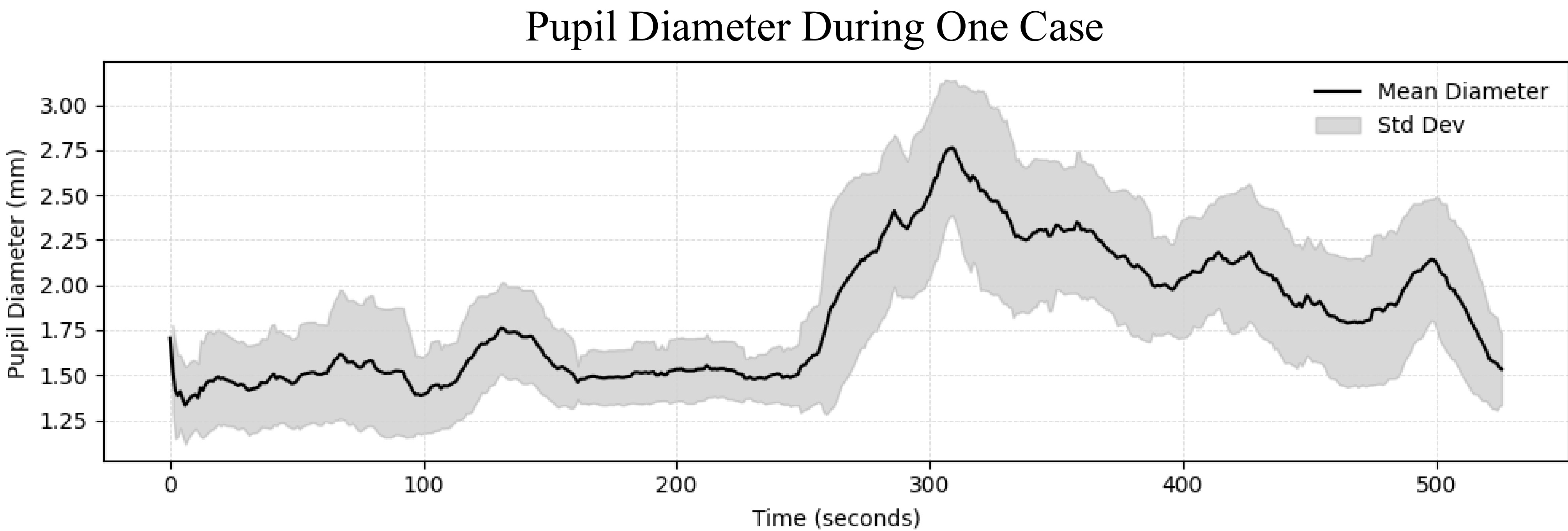


Figure 1. Example of average pupil diameter over the course of a procedure

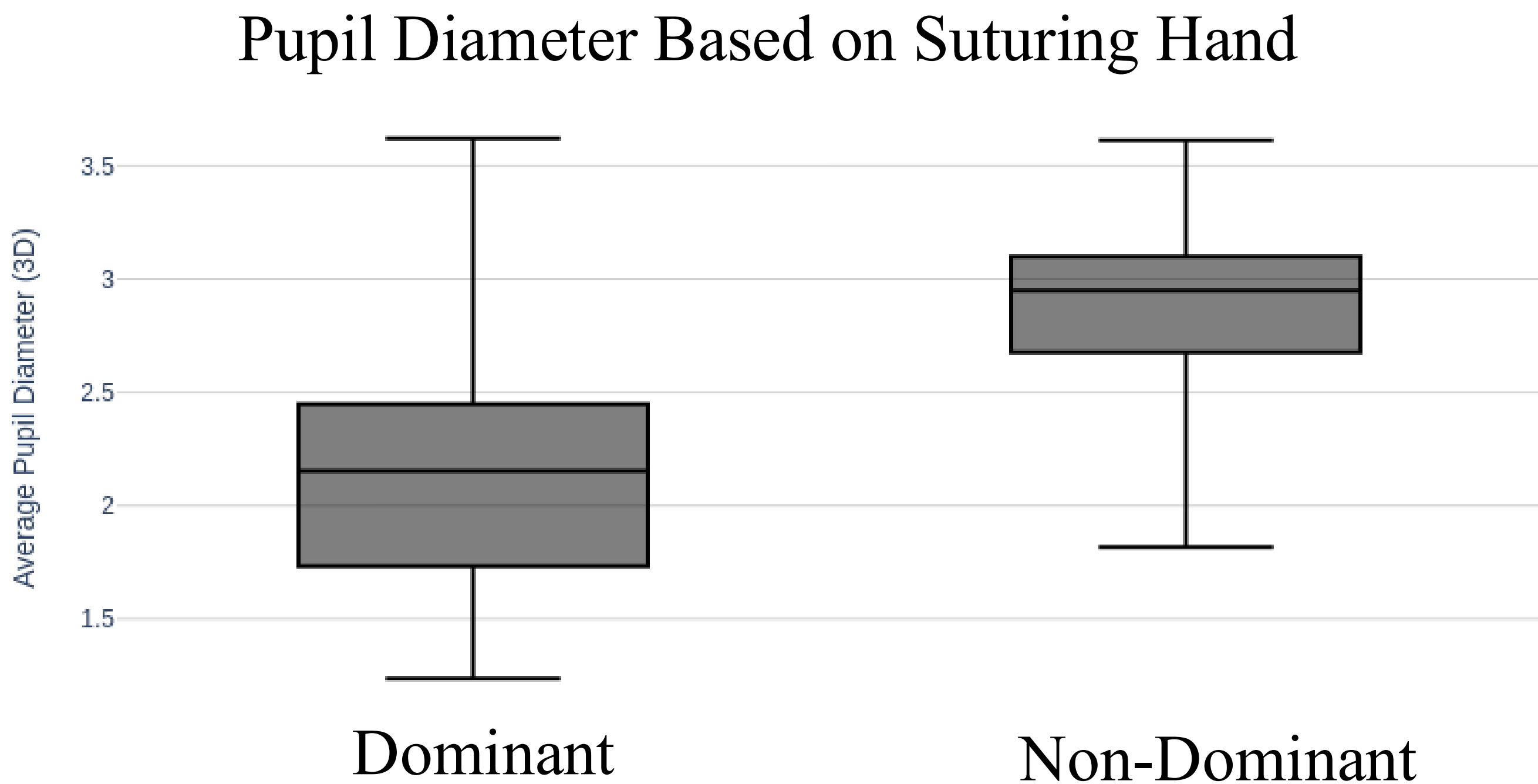


Figure 2. Significant larger pupil diameter when suturing with non-dominant hand (N=5) (2.79±0.48 vs 1.97 ± 0.73 mm, p<0.001)

Conclusions

- Pupil size can be tracked during surgical simulation and may provide insights into the quantifiably most challenging aspects of the procedure.

This might guide more targeted practice to improve the speed and efficiency of new skill acquisition.