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CORRESPONDENCE

Correlation between simulated microsurgical performance and stereopsis in prospective ophthalmic specialty trainees

David McMaster[1] · Bansri K. Lakhani[2]

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To the Editor:

Microsurgery requires high levels of visual skill and there is an ongoing debate as to whether stereopsis is a prerequisite for ophthalmic surgeons [1]. The Royal College of Ophthalmologists list binocular vision and stereopsis as essential attributes to entering ophthalmic specialist training (OST) [2]. We aimed to determine if there is a correlation between stereopsis and microsurgical simulator performance on first exposure, and if the advantage standardises after repeat simulator exposure. The Eyesi Surgical Simulator (VR Magic, Mannheim, Germany) emulates intraocular conditions in virtual reality and is widely used in OST (Fig. 1) [3]. Five foundation year doctors and ten medical students aspiring to apply to OST were recruited with informed consent at the Queen's Medical Centre, Nottingham in 2019.

Exclusion criteria included use of the Eyesi (or other virtual reality simulator) for more than 2 h within the last 6 months and a corrected visual acuity of 6/12 or worse. Our aim was to eliminate a warm-up effect whereby performance is influenced by getting to know technical features of the Eyesi simulator; unsurprisingly evidence shows that repeated attempts on the Eyesi improves scores [4, 5]. All participants were given a brief standardised introduction to the Eyesi by a specialty registrar and then immediately evaluated on their first attempt of the Navigation Training (Level 1) followed by the Forceps Training (Level 1) module, without a warm-up session. Participants had their visual acuity measured using a Snellen chart, their stereoacuity assessed with the Frisby Stereotest, and performance parameters calculated by the Eyesi.

There was no significant difference between the scores of foundation year doctors and medical students. Spearman's rank correlation coefficient (r_s) was used to analyse association between stereoacuity and Eyesi performance, determining whether there was a weak ($r_s = 0$–0.3), moderate ($r_s = 0.3$–0.5), strong ($r_s = 0.5$–0.9) or very strong ($r_s = 0.9$–1) association. Statistical analysis revealed on the first Eyesi module attempted there was a strong association between stereoacuity and task score ($r_s = -0.62$, $p = 0.013$), odometer ($r_s = 0.57$, $p = 0.026$) and injured cornea area ($r_s = 0.71$, $p = 0.003$) with moderate association between stereoacuity and efficiency ($r_s = 0.41$, $p = 0.133$) (Fig. 2). On the second Eyesi module attempted, there was weak association between stereoacuity and task score ($r_s = 0.14$, $p = 0.622$), odometer ($r_s = -0.06$, $p = 0.824$), injured cornea area ($r_s = -0.12$, $p = 0.670$) and efficiency ($r_s = -0.11$, $p = 0.698$) (Fig. 2).

We show that although upon initial exposure to the Eyesi simulator there is a clear correlation between performance and stereopsis, the advantage is quickly standardised, and the correlation is significantly reduced. Our results indicate that whilst stereopsis plays an initial role, upon repeat exposure to intraocular surgical simulation there is a weak association and the initial advantage is standardised. This suggests it would be inappropriate to assume those with better stereopsis make better ophthalmic surgeons, and highlights that repeated simulator use potentially negates the advantage of higher levels of stereopsis and is thus an additional benefit in OST.

✉ David McMaster
mzydhm@nottingham.ac.uk

[1] University of Nottingham School of Medicine, Nottingham, UK

[2] Department of Ophthalmology, Nottingham University Hospitals NHS Trust, Nottingham, UK

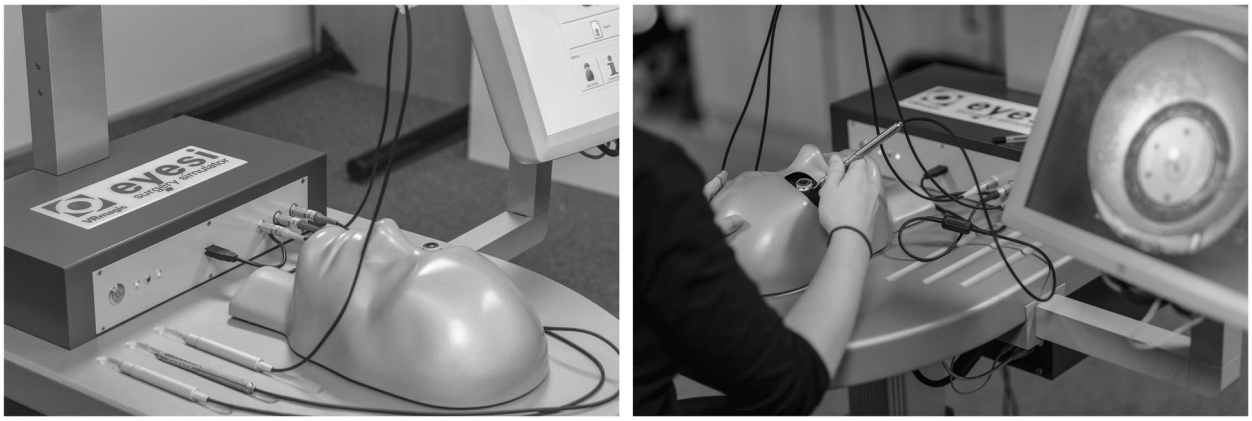

Fig. 1 The Eyesi Surgical Simulator. VR Magic, Mannheim, Germany.

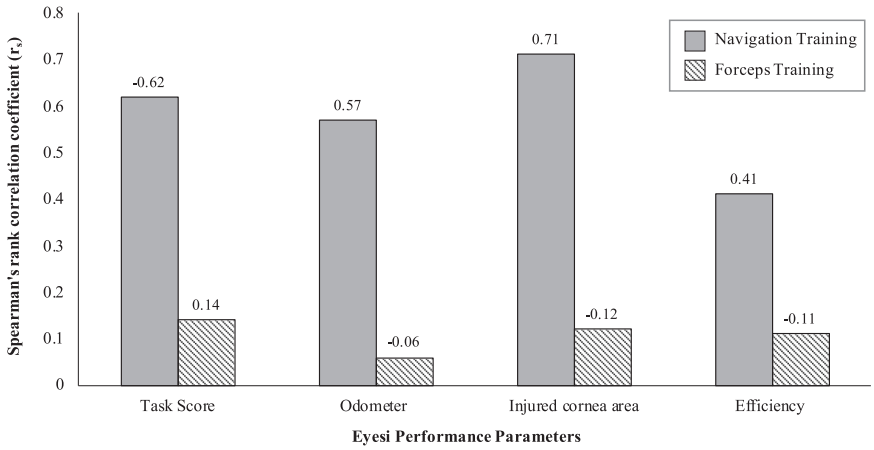

Fig. 2 Association between stereoacuity and Eyesi performance parameters. Statistical analysis was used to determine the association between stereoacuity and performance on the Navigation and Forceps training modules of the Eyesi Surgical Simulator.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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