REMOTE SUPERVISION FOR SIMULATED CATARACT SURGERY DURING THE COVID-19 PANDEMIC: EXPERIENCES FROM CHELTENHAM

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INTRODUCTION

Surgical training whilst maintaining social distancing has inspired the need for a remote approach to supervision. In Cheltenham, we have developed a couple of new methods to maintain acquisition of surgical skills. Ophthalmologists in Training can be supervised by their seniors from anywhere with access to video conferencing software.

1 MICROSCOPE TRAINING



Fig 1a, Trainee and trainer view of remotely supervised practice on a Leica microscope

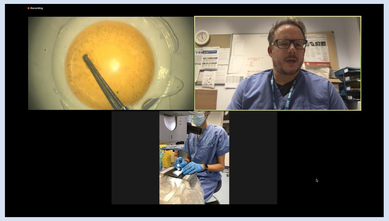


Fig 1b. Screen shot of the trainer's Zoom screen, showing how they can simultaneously observe the microscope view as well as the trainers posture and hand position

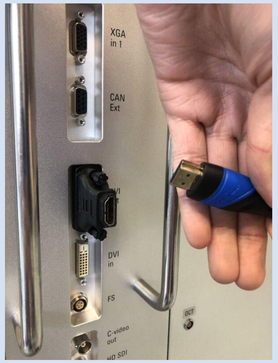


Fig 1c. HDMI cable takes video output from DVI out port



Fig 1d. HDMI output is converted to USB by Video Capture card before inputting to laptop

OUR SET-UP

- Using low-cost and easily available devices, we have demonstrated how to output a live feed from the Eyesi surgical simulator, or operating microscope, to your laptop.
- This combined video and audio feed can be used as a web cam on video conferencing applications, such as Zoom or Microsoft Teams, so a remote supervisor can watch and critique surgical simulation practice in real-time
- A second camera from a smart phone can be set up as an additional participant, with the shot angled towards the surgeons hands, to make the supervision even more comparable to an in-person session.

2 EYESI SURGICAL SIMULATOR TRAINING



Fig 2a. Remote supervision of Eyesi surgical simulator



Fig 2b. Eyesi surgical simulator (VR Magic)

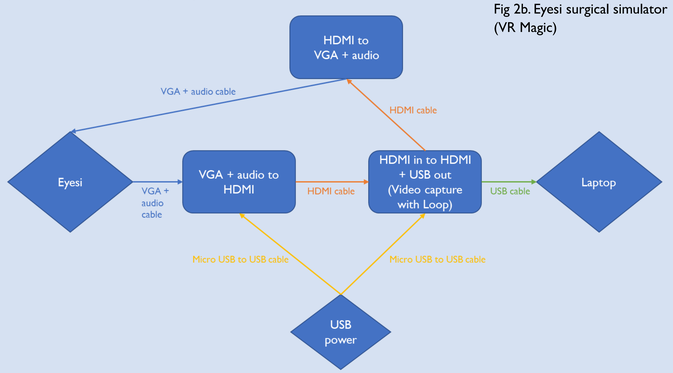


Fig. 2c. Diagrammatic representation of the video cables required to set up the remote supervision of the Eyesi simulator – this can be set up once and left in place.

RESULTS

The four Ophthalmologists in Training in our unit provided resoundingly positive feedback regarding their experience of remote supervision of simulated ocular surgery. No concerns were raised in relation to video resolution, audio quality and latency.

Supervising consultants and fellows also commented on the high quality of the simulation set up, and no issues where raised about the utility of the video feed.

RECOMMENDATIONS FOR CHANGE

With routine surgery list cancellations and reduced numbers of patients, supervised trainee cataract lists have been greatly diminished in 2020-21. We have therefore endeavoured to provide a useful alternative to organised lists, and in doing so, we have created a successful approach to providing remote supervision for simulated ocular surgery that should be maintained beyond the pandemic.

In theatre using our Leica microscope, in spare sessions or out of hours, surgical skills can still be developed. Using model eyes, such as those produced by Phillips Studio Eye, we have been able to practise nearly all the steps of phacoemulsification surgery. The supervising surgeon has a clear enough view to see clearly the structures, such as anterior capsule and or simulated vitreous, and can therefore give feedback to the operating trainee in real-time.

The Eyesi surgical simulator (VR Magic) had previously mostly been a self-directed learning environment, which has been proven to effective in reducing the rates of surgical complications.[1] Supervised practice on the simulator adds another facet to this. Consultants can supervise a trainee on the Eyesi simulator to establish a baseline proficiency prior to live surgery, or identify any potential areas for development.

Trainers from anywhere in the world can use this technology to supervise one-to-one or multiple trainees, and there is the potential for this to be integrated into courses to provide a more practical and immersive experience.

We hope that challenging scenarios such as posterior capsule rupture or small pupil techniques can be rehearsed in this closely supervised and high-fidelity learning environment.

Scan to see a video demonstrating our supervised microscope set up in action, and how to reproduce this in your unit

Scan to see a video demonstrating our Eyesi set up in action, and how to reproduce this in your unit

References:

1. Ferris JD, Donachie PH, Johnston RL, Barnes B, Olaitan M, Sparrow JM. Royal College of Ophthalmologists' National Ophthalmology Database study of cataract surgery: report 6. The impact of EyeSi virtual reality training on complications rates of cataract surgery performed by first and second year trainees. Br J Ophthalmol. 2019;104:324–9