Maximising cost-effectiveness and minimising waste in modern ocular surgical simulation

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Introduction

- **In the UK, the ophthalmic specialist curriculum mandates the use of surgical simulation in training. [1]**
- **As ophthalmologists return to surgical sessions following COVID-19 restrictions, the benefits of learning and maintaining skills through simulation have been increasingly recognised by juniors and seniors alike. [2]**
- **Ophthalmic surgical simulation has previously been demonstrated to be cost-effective and cost-saving due to reduced surgical complication rates in cataract surgery by junior trainees. [3] The benefits of promoting greater simulation use in training are obvious, but this new culture has not previously been reflected in traditional resource allocation in ophthalmology training programmes.**
- **An increasing range of model eyes for simulation are available, of varying complexity and expense. [4-5] It should be recognised that any effective simulation programme will not only have initial set up costs (microscopes, equipment), but will require an ongoing training investment, through the recurrent purchase of necessary consumables (model eyes, suture materials).**

Aims

• Following the recent creation of a bespoke ocular simulation suite, we purchased 80 model eyes with an initial outlay of £1518 (Phillips Studio, Bristol, UK). As there are currently 28 ST training posts in the West of Scotland, we realised that our resources would be quickly depleted if the model eyes were only used for their advertised purpose.

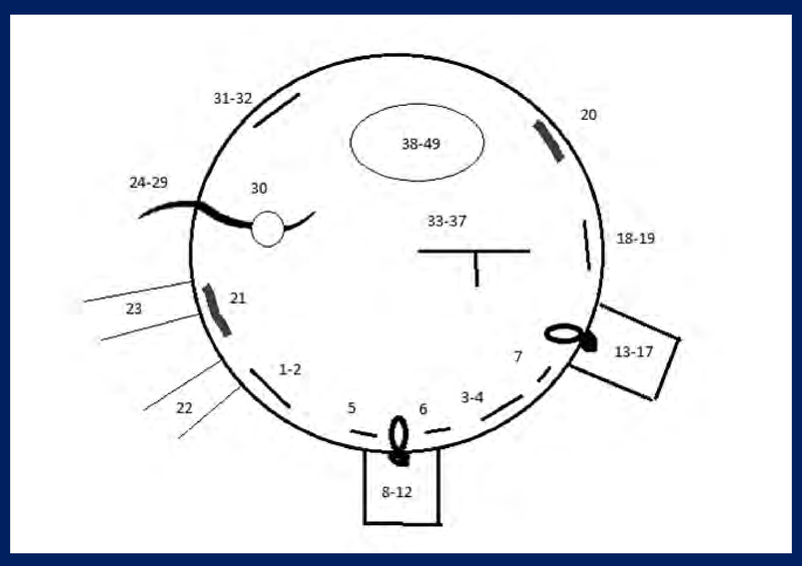
• To maximise use and minimise costs of these simulated model eyes, we allocated 3 eyes per trainee and promoted a "single eye, multiple procedures" concept. To prevent a "use once and throw out" mentality, we challenged the trainees to see 'how many procedures can you perform on a model eye?'.

Results

• The winning entry (figure 1 and 2) demonstrates 49 procedures performed by a single trainee on a single corneal suturing eye. This included limbal traction sutures; cataract wounds; scleral flaps; tectonic graft and penetrating injury repairs.

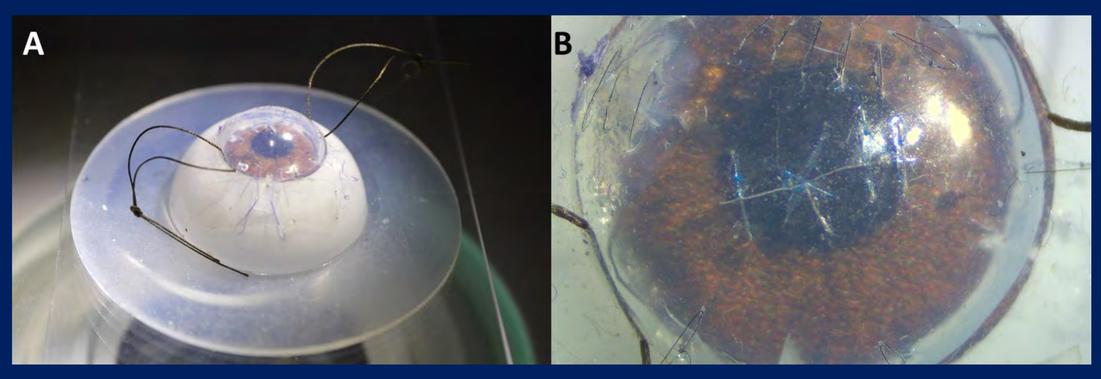
• Figure 1: Diagram of single model eye with simulated surgical procedures performed as described.

1-2: phacoemulsification (phaco) wound and suture, 3-4: phaco wound and suture, 5-6: partial thickness corneal relaxing incisions, 7: paracentesis, 8-12: scleral flap, scleral punch, surgical iridotomy, 2x permanent suture, 18-19: phaco wound and suture, 20-21: limbal traction sutures, 22-23: scleral tunnels, 24-29: penetrating injury with foreign body repair (iris FB removal, iris suture 7-0 x 1, corneal suture 1-0 x3, limbal suture), 30: corneal glue, 31-32: phaco wound and suture, 33-37: corneal laceration repair (5x suture), 38-49: tectonic graft (12x suture)



• Figure 2: Colour photos of winning entry

A: Macroscopic photo of corneal suturing eye demonstrating traction sutures and scleral flap with adjustable sutures. B: Microscopic photograph showing tectonic graft superiorly and corneal laceration repair centrally.



Conclusion

• This competition demonstrated an imaginative use of simulation equipment to achieve multiple outcomes, saving an estimated £200 in the process. We would encourage other training programmes to exploit the healthy competitive streak found amongst many trainees to optimise surgical training in this cost-effective way, while maintaining the sustainability of simulation training.

References

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