Simple Technology to Enhance Practice and Training in Ophthalmology: Experience with Automated Dupe A-P Trainer

Dupe Ademola-Popoola

Paediatric Ophthalmology, Strabismus & Oncology Unit, University of Ilorin and University of Ilorin Teaching Hospital, Ilorin, Nigeria.

Corresponding author: *E-mail: Popoola.d @unilorin.edu.ng / dupsyp@yahoo.com*

Background: All ophthalmology training units irrespective of resource capacity require simulation for surgical and non-surgical training as dry and/or wet labs before graduation to live patients; this is to ensure safety and competency in ophthalmology.[1,2] Available simulators vary greatly in complexity and cost. They range from high fidelity, high-cost devices like the Eyesi® and Helpmesee®[3] to moderate devices like the Kitaro®[4], Bionico®, Philips studio®; these are typically expensive for individual training units even in highly resourced centres.

Low cost manually operated such as Idrees®[5] eye surgical practice model are also available. This report describes the features and utilization of the first known automated, low fidelity practice head technology for surgical training in wet labs and some for clinical procedures, which would be most useful in most low resourced ophthalmology training units.

Methods: Low cost, automated eye trainer (Dupe A-P) was produced to serve as a holder for practice eyes (bull, goat or pig) in the wet lab, to teach surgical procedures such as trabeculectomy, cataract surgical steps (SICS), intravitreal injections and Intra ocular pressure measurement (Figure 1). It was developed from a fully manual system to a fully automated model over a nine-year period. It works by creating an adjustable negative pressure system to hold the enucleated goat, pig or bull eyes on one or both sockets of the individually made head-face model. Training with it can be further enhanced by utilizing microscope adapters with smartphones holders which may be attached to the ocular of an assistant microscope to record and document surgical procedures via the camera of a smartphone. This is then transmitted via wireless connection systems for real time or asynchronous tele-training purposes (Figure 2).

Results: Automated Dupe A-P eye trainer has been deployed for training in the wet labs of ophthalmology training institutions for 11 years from 2010 and for assessment purposes during National Postgraduate Medical College of Nigeria examinations which hold twice a year. They were used during objective structured practical examination stations with an average of 85 candidates at each examination over 4 years from 2017. It is typically used to train and assess suture placement, cataract surgical steps, intravitreal injection, and trabeculectomy surgical steps on enucleated animal eyes. It can also be used for training on intraocular pressure measurement and Trans-scleral Laser Techniques.

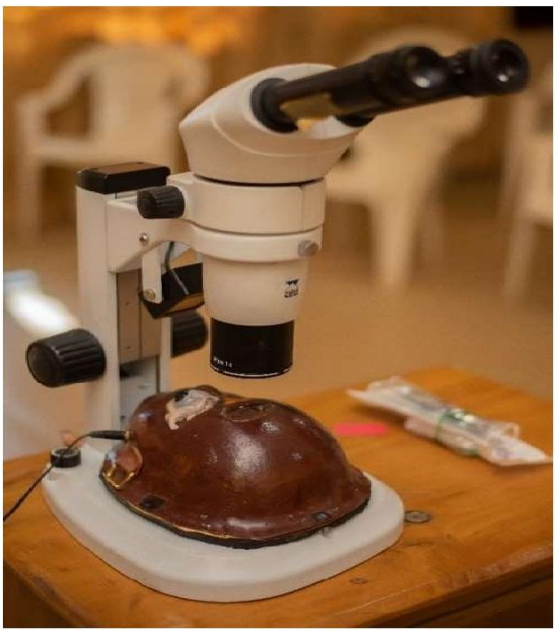

Figure 1: A-P automated Eye Trainer with enucleated animal eyes for surgical training.

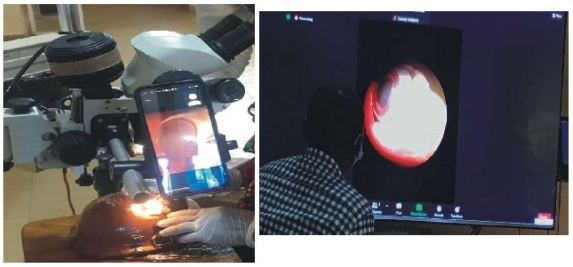

Figure 2: A-P Automated eye trainer with Smartphone microscope used to wirelessly transmit surgical procedure remotely

Conclusion: Automated Dupe A-P low-cost technology for practice and training has been used to enhance competency and assessment in Ophthalmology and is recommended to all training institutions while efforts to continue to improve the functionality are encouraged.

Keywords: Microscope Adapter, Dupe A-P Eye Trainers, Simulators, Training devices.

References

1. la Cour M, Thomsen ASS, Alberti M, Konge L. Simulators in the training of surgeons: is it worth the investment in money and time? 2018 Jules Gonin lecture of the Retina Research Foundation. Graefes Arch Clin Exp Ophthalmol. 2019 May;257(5):877-881. doi: 10.1007/s00417-019-04244-y. Epub 2019 Jan 15. PMID: 30648208.
2. Royal College of Ophthalmologists. Simulation in Training. https://www.rcophth.ac.uk/training/ost-information/simulation/ cited 15/10/21
3. Helpmesee: https://helpmesee.org/ cited 15/10/21
4. Kitaro Eye. https://www.kitaroeye.com/ 15/10/21
5. Idrees Eye Surgery Practice Head. https://guldenophthalmics.com/wp-content/uploads/2021/01/2021-Catalog.pdf cited 21/12/21