

A systematic review of competency-based simulation training in ophthalmic surgery as a part of curriculum



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HelpMeSee

Background

Simulation-based training has gained significant interest in ophthalmic surgical education due to its proven ability to enhance skills development and patient safety.^{1,2,3} However, despite the growing evidence, integrating simulation-based training into formal surgical curricula presents ongoing challenges. Successful integration has been demonstrated in Denmark and UK.^{4,5}

Objectives

To understand how simulation-based training has been incorporated into training programs in different parts of the world.

Approach

Publicly available information from university websites, PubMed and public search engines was conducted to check the use of simulation as a part of curriculum, description of the details of implementation, types of simulators and the resources availability. We also contacted program directors in HelpMeSee's network to identify the challenges for integrating near aviation like model in academic curriculum.

Key Findings

- Most countries have not adopted simulation formally in surgical education
- Most simulators are part task trainers
- Most simulators available currently offer visual cues and there are only few that offer haptic feedback
- In many training programs, learning is self directed

Use of High Fidelity VR Simulators

Virtual reality simulators often used in ophthalmology training include EyeSi, Isight, MicroVisTouch, PhacoVision, Alcon Fidelis and HelpMeSee. From 126 programs in the US, 95 had access to EyeSi.⁶ In Canada 8 out of 15 programs had access to virtual reality simulators.⁷ In the UK, VR simulator were available at 31 program locations.⁸

In our review of training program from 197 institutes in Latin and South America, 43 for China, 326 from India and 88 from Africa most did not specify locations where the VR simulator training could be accessed (search conducted only in English), though several publications attest to effectiveness of training and a handful of training centers offer the option.

Other Simulators and Tools for Training

Artificial eyes: Philips Studio, SimulEye, Bioniko, Kitaro, plastic model, synthetic balls, simulation eyes produced by 3D printing

Animal and human cadaver eyes

Others: tomatoes, apples and grapes.

Implementation Challenges VR Simulators

- Capital and ongoing investment for equipment
- Resident/surgeon time away from work
- Loss of revenue: Overtime compensation of staff time or decrease in patient volume
- Need for advance planning to adjust for clinical rotation
- Institute budget allocation to cover training costs including payment to instructors, space and others.
- Institute bureaucracy and limited financial decision power of ophthalmology program directors.

HelpMeSee Solution

Experienced instructor + standardized curriculum + haptic feedback + virtual reality = training to proficiency

HelpMeSee training delivery model helps reduce cost by centralization of resources. It eliminates the need to purchase, maintain the equipment and ensure efficient utilization of human resources. This training is proven to be effective in reduction of surgical errors.^{9,10}

HelpMeSee Eye Surgery Simulator



Manual small incision cataract surgery simulation-based training course - 4 days; Phacoemulsification course- 5 days, Complications course -1day, Suturing course-1 day and other combinations.

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