Commentary: Ambidextrous practice makes eye surgeon perfect

Dexterity is one of the core skills of a good surgeon and is even more important for a microsurgeon, such as an ophthalmologist. The authors of the accompanying article[3] used a commercially available hi-tech surgical simulator called EyeSi (VRmagic software version 2.9, Mannheim, Germany) for ophthalmic surgeons to practice capsulorhexis in a virtual reality (VR) environment. Yours truly also had the opportunity to practice on this device at Sankara Nethralaya, Chennai. In this study, the authors uniquely looked at the improvement in the function of the non-dominant hand over the course of three trials and found a noticeable difference.

**Kitchen ophthalmic surgeon**

Expensive VR simulators may not be available to most ophthalmic residents in training; therefore, the best option for most of them is to practice in the wet lab on animal or cadaver eyes. In my residency, we used to have phone numbers of the nearby butchers so that we could call and ask for goat eyes to be kept aside for us to use. Even this may be difficult as many trainees may not have easy access to a wet lab or cadaver eyes.

A low-cost, clean, and effective method of practicing eye surgeries at home in the kitchen was described and demonstrated in the video “Kitchen Ophthalmic Surgeon”[2] available on YouTube (https://www.youtube.com/watch?v=WPdlj9EBevo) by Akkara and Kurikose.[1] This video shows how fruits and vegetables can be used to practice surgical steps with the help of a smartphone standing in as a microscope with illumination, magnification, and recording facilities. The surgeries demonstrated in the kitchen include manual small-incision cataract surgery, capsulorhexis on tomato, phacoemulsification on potato, suturing on grapes, trabeculectomy, single-pass four-throw pupilloplasty, and the sewing machine technique of iridodialysis repair. This method of practicing in the kitchen can be done very easily at no extra cost and helps improve surgical dexterity in the operating room.

**Left or right-handed?**

Most people are right-handed and thus most eye surgeons are right-handed. They find it easier to make a rhexis side port incision on the right side, hold a phaco probe in the right hand, chopper in left hand, and even find it easier to operate right eyes of patients. Yes, it is a documented risk factor that left eye surgery is more prone to complications.[6] When a left-hander (southpaw) becomes an eye surgeon, they may initially try to operate right-handed as their trainers and training material is for right-hand-dominant surgeons. However, most end up being left-hand-dominant surgeons, making rhexis side port incisions on the left side, holding phaco probe in the left hand, chopper in right hand, and find it easier to operate on left eyes of patients.

A study of 30 surgeons by Park et al.[5] using the EyeSi surgical simulator as in the accompanying study[1] showed that non-dominant-hand surgery was slower, less efficient, and less safe. However, Sharma and Vajpayee et al.[6] from Rajendra Prasad Center for Ophthalmic Sciences showed that for experienced surgeons, phacoemulsification with non-dominant hand can give equally good surgical outcomes while having advantages such as avoiding changing the surgeon’s position for other-eye temporal or on-axis incision surgery. It has also been debated whether it is more advantageous
in phacoemulsification to hold the chopper in the dominant hand as it is the instrument that needs fine manipulations for successful chop maneuvers.

**Importance of being ambidextrous**

Right-handed surgical trainers often find it more difficult and a bit disorienting to train left-handed surgeons as they hold the instruments differently and prefer incisions in mirrored locations. Surprisingly, Kim et al. published a study set in Massachusetts Eye and Ear Infirmary, Boston, where they showed that complications such as posterior capsular tear and vitreous loss were significantly lower in left-handed surgeons than in right-handed surgeons. Dr. Blomquist questioned the validity of this conclusion, but it is still an interesting finding that might have a logical explanation.

It is very likely that all left-handed surgeons learn to be ambidextrous due to necessity, whereas most right-handed surgeons are not ambidextrous. An ambidextrous surgeon can easily, comfortably, and quickly perform a safe and efficient surgery.

**Does VR help?**

A Cochrane analysis by Lin et al. looked at studies based on EyeSi simulator (VRmagic, Mannheim, Germany) and HelpMeSee simulator (HelpMeSee, New York, NY) and concluded that VR training may be more effective than no supplementary training, but the evidence comparing it with conventional wet lab training was less consistent. In addition to these systems, Kim et al. developed a VR cataract surgery simulator for capsulorhexis with haptic sensory feedback using an accelerometer and vibration motor to enhance the VR experience. Another team led by Jayakumar et al. from Amrita Vishwa Vidyapeetham, Kerala developed a low-cost VR cataract simulator using a leap motion controller (UltraLeap, California, USA) and programmed in Unity3D.

**Take-home message**

Trainee ophthalmic surgeons should improve the hand-eye coordination of their non-dominant hand through practice. This need not be only in the operating room, wet lab, or surgical simulator. They can practice, for example, brushing their teeth or writing with their non-dominant hand. I remember a senior colleague of mine advising to flip chapatis or burgers with the left hand. Incorporate non-dominant hand training in aspects of daily life. Of course, practice makes perfect, and training can be taken home as a kitchen ophthalmic surgeon.

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