Surgical Skills: A shift in the Learning Paradigm

Acquisition of surgical skills and technical competence has been the bedrock of surgery. During the surgical training program for postgraduates, technical skills improve with practice, and surgical judgment deepens as a result of exposure to evidence, patients, and outcomes. Surgical education has followed an apprenticeship model since it was developed by Sir William Halstead at John Hopkins Hospital Baltimore USA in 1890's when he was chief of surgery there. Mentoring has been cornerstone of this way of teaching.

Modern research in surgical education has examined the steps involved in attaining motor skills and the Fitts and Posner's three-stage theory of motor skill acquisition is the most widely accepted for motor acquisition. One of the basic premise of this theory is that the earlier stages of teaching technical skills should take place outside the operating theatre; practice is the rule until automaticity in basic skills is achieved. This mastery of basic skills allows trainees to focus on more complex issues, both technical and nontechnical, in the operating theatre.

Ericsson in 1996 clearly showed most professionals reach a stable, average level of performance and maintain this status for the rest of their careers. Ericsson argues that the number of hours spent in deliberate practice, rather than just hours spent in surgery, is an important determinant of the level of expertise. Deliberate practice calls for the individual to focus on a defined task, typically identified by a teacher, to improve particular aspects of performance; it involves repeated practice along with coaching and immediate feedback on performance. One study showed that no relation existed between the American Board of Surgery in Training Exam (ABSITE) score and technical skill.

Many models have been tried and tested by various authorities over the two decades, like the Objective Structured Assessment of Technical Skills (OSATS) format which has similar validity and reliability for summative high-stakes evaluation purposes as has the more traditional Objective Structured Clinical Examination (OSCE). The Royal College of Surgeons of England (RCS) developed in 1993 a 3-day Basic Surgical Skills course, aimed at teaching junior trainees "one safe way" of performing basic surgical techniques. This has come a long way since then. Similarly other colleges and training institutions in developing countries realized the need for such training aid and either on their own or in collaboration developed these programs. Postgraduate Institute of Medicine of Sri Lanka and the Royal College of Surgeons of England have collaborated with the Commonwealth of Learning (CoL) to adapt UK training materials for use by trainee surgeons in Asia and subsaharan Africa. Indonesia has used the material over ten years for nearly 1500 trainees in 13 centres.

The College of Physicians and Surgeons Pakistan took up the initiative some time back and introduced the concept in Pakistan of Out of Theatre Surgical Skills Development through its Primary Skills Workshops for Fellowship trainees. Other colleges and universities like the King Edward Medical University, Dow University of Health Sciences and Aga Khan University, just to name a few have in the recent past started using the same methodologies and strategies for both undergraduate and postgraduate trainees.

These programs have subjectively certainly started showing the fruits of the labour put in yet, very few instituions have applied any objective evaluation and apprasial process to see how well these training methods have shown the results on the field where it really matters i.e the operating theatre.

McGill University in Montreal, developed the McGill Inanimate System for Training and Evaluation of Laparoscopic Skills (MISTELS) which allowed the use an inanimate box to simulate the generic skills needed in the performance of laparoscopic surgery. Imperial College Surgical Assessment Device (ICSAD) from United Kingdom tracks hand motion using sensors placed on the trainee's hands during the performance of a task. The sensors translate movement into a computerized tracing of hand motion, which provides an effective index of technical skill in both Open and Laparoscopic procedures.

Seymour in 2002 and Grantcharov in 2004; in randomized trails showed that surgical trainees who did not have the benefit of simulation training made more errors compared to trainees who have been trained on low-fidelity virtual reality models (laparoscopic box trainers) when performing a laparoscopic cholecystectomy. There is a suggestion that surgeons in training who have "played" more video games scored higher on tests assessing their surgical capabilities. The idea of using games to train doctors is nothing new; a study in 2007 also showed that doctors who spent time playing video games showed

better performance in laparoscopic tests than even doctors with more experience in those procedures, the surgeons who scored in the top third in video games used for the experiment performed surgical tests in 40 percent less time, with 50 percent fewer errors. The whole point about surgery is to execute small, finely controlled movements with your hands and it is noticed the precision of some movements looked very similar in certain video games.

Simulation and Virtual Reality systems used for training surgeons in this country should be assessed with the same rigour as any other intervention in healthcare and we should not lose sight of the fact that outcomes are the ultimate measure of any intervention in healthcare. Our goal should be to objectively assess these newer methods of training and see if the resourses being utilized on them are producing the results needed, the assessment of technical skills needs to be integrated with cognitive and behavioural characteristics such as team skills and decision making in order to develop methods that assess surgical competence comprehensively. Yet the bottom line: deliberate practices makes perfect, or at least better.

RESOURCES

1. Reznick R K. MacRae H. Teaching Surgical Skills Changes in the Wind NEJM. 2006; 355(25): 2664-2669.

2. Fitts P M, Posner M I. Human performance. Belmont, CA: Brooks/Cole, 1967.

3. Ericsson K A. The acquisition of expert performance: an introduction to some of the issues. In: Ericsson KA, ed. The road to excellence: the acquisition of expert performance in the arts and sciences, sports, and games. Mahwah, NJ: Lawrence Erlbaum Associates, 1996; 1-50.

4. Martin J A, Regehr G, Reznick R, MacRae H, Murnaghan J, Hutchison C. Objective structured assessment of technical skill (OSATS) for surgical residents. Br J Surg 1997; 84: 273-8.

5. Moorthy K, Munz Y, Sarker S K, Darzi A. Objective assessment of technical skills in surgery BMJ. 2003; 327(7422): 1032-1037.

Dr. Shams Nadeem Alam
Associate Professor of Surgery
Dow University of Health Sciences
Karachi - Pakistan