

Simulator Based Skill Training: Is It Worth?

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Use of simulators is quite common in aviation industry, pilots would not hold down a job without proof of simulation training. Similarly in medical field, surgical simulation is increasing in western world as opportunities for learning through work on "real" patients have decreased [1]. Such a scenario does not exist in India. In this new model of surgical skill training, basic surgical skills are learnt and practiced on models and simulators with the aim of better preparedness for operating room.

Surgical procedures especially those with complex instrumentation have a steep learning curve, so it takes a number of repetitions before trainees have the manual dexterity to do it right. Simulators allow trainees to practice over and over again without any harm to the patient. Mistakes on the simulator are harmless and are rectified by repeated deliberate practice. Simulation for surgery has the potential to afford the opportunity for the trainee to obtain and refine surgical skills in an "inconsequential" manner (i.e., without morbidity to the patient).

It has been demonstrated that transfer validity (transfer of training) of residents trained on an arthroscopic knee simulator showed a greater skill level in the operating room compared with the control group [2]. It has been found that the simulator is able to show statistically significant differences in skill level between first year postgraduate residents and both final year postgraduate residents and community-based orthopedic surgeons, but not between the latter two groups. Hence, it can be inferred that junior residents' surgical skills would be enhanced by training on an arthroscopic simulator before beginning their arthroscopic operating room experience. Higher levels of surgeon experience resulted in improved efficiency when performing

diagnostic knee arthroscopy on the simulator [3].

But, surgical simulation, by itself, will not ensure that the trainee will become a more skilled surgeon. A carefully constructed and validated curriculum must form the foundation and precede the employment of the simulator. The specific tasks on which a trainee has to be trained must be identified and then parameters should be created for that task which should be clear, objective, measurable and achievable. The trainee must know not only how to execute the proper technique, but also the potential errors to be avoided. Once the parameters for a specific skill or a particular procedure are validated, simulations/simulators can be designed specifically to mimic that experience and train those skills.

The use of simulation to demonstrate surgical skills may become a tool for pass-fail certification or maintenance of certification for practicing orthopedic surgeons in the future. Training in arthroscopy is one such area where simulator teaching is in practice in few institutions in developed countries.

Surgical simulation advantages include (a) Providing the trainee with "synthetic experience" with the chance to acquire surgical or procedural skills, (b) Permitting the trainee to enact procedural/technique errors in an "inconsequential" manner (no patient morbidity) and to learn from those errors to improve their technique, (c) Enabling the trainee to engage in repetitive practice and (d) Providing the feedback to trainee, which helps in documenting the progress toward a predetermined benchmark.

Surgical simulation has some distinct disadvantages as well. Firstly, the simulator, by itself without a pre-existing validated curriculum, may be ineffective in improving the skill sets necessary to

train essential surgical techniques. Secondly practice on the simulator without specific, defined performance goals has the potential to ingrain poor habits/skills. Thirdly, the high cost of the simulators remain the biggest inhibiting factor especially in country like India.

In my opinion although there might be many advantages of simulator training might be but simulation does not become a substitute for the apprenticeship model. The use of simulators does not replace the place of actual one-on-one interaction with faculty mentors and surgeons who help and train the residents on using the equipment and interacting in surgery. Residency should always be an apprenticeship model where faculty takes pride in teaching a junior resident on improving their skills.

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