



Modern challenges in the education of young surgeons: the two sides of the coin – minimal number of procedures: mentor’s point of view

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Abstract: Comprehensive and complete preparation of a surgeon is possible only in suitable conditions. Minimal number of procedures dramatically influences on the whole process of young surgeon’s education. The number of procedures that a resident performs by himself should be estimated at the official program of residency. Approximately, every procedure requires around 2 months to be learnt, so it is possible to master from 6 to 12 procedures per year, depending on its complexity. Some procedures can be practiced at the same time. The continuance of residency and duration of surgical training make it possible to understand how many procedures can be performed. The number of mentors, residents and patients should be also taken into account, the training process needs an individualized approach. The aim of this opinion paper is to discuss the minimum number of procedures that surgical trainees should perform during internship or residency from the mentor’s point of view. We also proposed to divide the educational process into several stages and made several suggestions for improving the evaluation of acquired skills. In conclusion, the final result of resident’s training in surgery depends on many factors. The establishment of minimal number of procedures in the program, fulfilment the plan, control of education process and quality of training, individual approach and accounting for hidden problems are essential elements that provide efficacy of young surgeon training.

Keywords: Surgical training; residency; education; practical skills; evaluation of practical skills

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Introduction

The quality of resident’s training is good if a mentor is ready to be the resident’s patient. To achieve such a high level of preparation is possible if all the needed conditions are available. Minimal number of procedures dramatically influences on the whole process of young surgeon’s education. But this number very often doesn’t correspond

to personal needs of the residents (1).

The number of procedures that a resident performs by himself should be estimated at the official program of residency. The training process needs an individualized approach that includes debriefing and resident’s feedback (2).

The aim of this opinion paper is to discuss the minimum number of procedures that surgical trainees should perform during internship or residency from the

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mentor's point of view.

The process of practical training

Complicated procedures include many separate steps which require time to be managed. Traditionally, a mentor teaches how to perform every step and then—the whole operation (procedure). In average, performing each step in the first 10–20 [for some procedures it is needed 20–25 times (3)]—procedures allows to perform the next 5–10 procedures by its own.

Approximately, every procedure requires around 2 months to be learnt, so it is possible to master from 6 to 12 procedures per year, depending on its complexity. Some procedures can be practiced at the same time.

The continuance of residency and duration of surgical training makes it possible to understand how many procedures can be performed. The number of mentors, residents and patients should be also taken into account.

The most frequent operations in general surgery are: (I) exploratory laparoscopy; (II) open and laparoscopic appendectomy; (III) open and laparoscopic cholecystectomy; (IV) inguinal and umbilical hernia repair; (V) phlebectomy; (VI) suture plication in perforated ulcer of stomach or duodenum; (VII) bowel resection with anastomosis application; (VIII) stoma exteriorization; (IX) removing of benign tumors of soft tissues; (X) incision and drainage of superficial abscess; (XI) wound dressing; (XII) bleeding control.

If it is possible, some extra operations can be mastered, for example, on thyroid gland, on liver, on pancreatic gland; thoracostomy and thoracoscopy; gynecological and oncological surgery; thrombectomy and etc.

Thereby, there can be a big diversity of surgical procedures to acquire.

Previous and adjacent preparation of a young surgeon

Training in related specialties plays a very big role in surgical residency. It is extremely important to master basic surgical principles (4) in gynecology, oncology, hepatobiliary surgery, urology, vascular, thoracic, and purulent surgery. Due to all these facts residency programs vary from country to country. But it's obvious that sometimes a program provides not enough time for general surgery. From time to time young surgeons should repeat practical skills, which were acquired before, especially after rotations and long

training on related specialties.

Young surgeon should have achieved a certain level of preparation by the time of his residency, or if the duration of the residency allows, in the very beginning (5). It will permit him to perceive effectively practical part of surgical procedures. Medical University provides good scientific and theoretic base. But practical skills development is under the responsibility of surgical trainee.

Stages in acquiring practical skills by a future surgeon

The first stage of practical training can be developed on the initial years of Medical education. The main task on this stage is to inculcate manual skills training through mastering basic surgical procedures. Such trainings involve fine motor skills of the hands. Examples of the trainings: exercises with matches, exercises with clamp, looping (alternating right and left) and knotting; using different techniques of looping and their combinations; correct use of surgical tools in suturing and others.

The first stage requires a lot of time of self-determined training for not spending time on it in the residency.

We started to make a video course of such training that is available on the link (6).

Such trainings also permit to find out those students who lean towards some surgical specialization. Their achievement of real practical results forms self-insurance and helps to make a professional choice and facilitates the selection.

The second stage is closely related to the work in the operation room. The most important task on this stage is to learn how to manipulate different equipment: surgical lamp, operating table, coagulation, surgical and laparoscopic tools. Thereafter, a student learns how to assist on traditional and laparoscopic operations.

This period or training helps to adapt to the operation room and to the work in real conditions. In the training program it is desirable to provide simulators usage, which permits to optimize educational process, including laparoscopic techniques.

Some countries offer to divide the education of a surgical trainee into 5 steps (7).

Some students make up their mind about surgical specialization only in the last years of studying. And their future training program should take it into account. For a surgeon it is essential to develop manual skills to get ready for complicated procedures. We can compare

surgical work with a musical performance: a musician goes a very long way from the first exercises to the real concert. And the basic preparation of the future residents can differ a lot and it influences on the individual training program.

Suggestions about the evaluation and control of the skills

Other very specific and important question is how to control the quality of resident's training and how to assign the responsibilities. Ordinary oral exam [that is commonly used, for example, in Belarus (8)] is not a proper form for assessment on this stage. The command of theoretical knowledge is important, but a resident is already a person with medical diploma and after residency we need to evaluate his practical skills—how well the trainee is prepared to work in real conditions. In some institutions the system of double control (theoretical and practical skills) of medical graduate was tested (9). Something similar should be done with final exam of surgical resident. The exam can be a real operation, where mentor will assist.

Problems of the modern residents and their mentors

Modern surgery is a very young science. The training of previous generations of surgeons wasn't related to mastering modern techniques which are used nowadays; a lot of areas were learnt empirically; the methods of teaching changed. The motivation of young surgeons is closely related to mastering modern specialties, aiming to a well-paid profession. The motivation of their mentors is more difficult problem. The key question in their work is a teaching load, that can vary a lot in different countries, from 150 to 800 hours per year for one mentor. Material reward and professional recognition are also important (10).

It is worth mentioning the hidden problems of residents' training. It is obvious that a lot of trainees face difficulties with fulfilment the education program. Sometimes there is a rivalry between a resident and the mentor that leads to unwillingness to teach. Also a lot of residents may enter the same institution contrary to limits and there will be less work for each of them. In current situation, epidemic of COVID-19 interferes with the number of the operations in clinics (the departures are closed or repurposed). All this makes impact on the training process.

Conclusions

The final result of resident's training in surgery depends on many factors. The establishment of minimal number of procedures in the program, fulfilment the plan, control of education process and quality of training, individual approach to every resident with debriefing and their feedback (2) are essential elements that provide efficacy of young surgeon training. Accounting for hidden problems of both sides—residents and mentors—will also help to improve the educational process.

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