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Surgical education in my Country

Domenico Russello, M.D.

Professor of General Surgery – University of Catania
Chief of General Surgery, Hepatobiliary and Mininvasive Surgery Unit, Cannizzaro Hospital, Catania

Surgical education went through a deep change during the last 20 years as result of an innovative didactic request and of different possibilities offered by new technologies and robotics.

Nowadays, all over the industrialized countries, it is clear the loss of interest towards general surgery. In the past, the demand for the surgical career was redundant ; on the contrary, we are, today, assisting to a collapse of the number of young doctors who choose to follow the surgical career as consequence of several factors according to the country involved.

In Italy, the problem is relevant if we consider that the number of applications to be admitted to the Postgraduate Schools is deficient. This lack of request is strictly related to the difficulties to offer innovative educational and learning models.

I, firmly, believe that University should motivate the young doctors to follow the main surgical principles finding out the true features of the surgical art such as decision-making aptitude, competences, sacrifice and devotion to work and study.

The traditional pedagogic model was characterized by the total integration of students with older surgeons. Nowadays, this model has been replaced with new instruments offered by information and telecommunication network, simulators, manipulation instruments up to robotics.

In 1904, dr. W. Halstead, in USA, proposed a surgical training model based on the concept of responsibility which should grow ever and ever during the postgraduate years up to the Chief Resident level achievement.

Halstead's main principle was summed up with the popular "see one, do one, teach one" referring to the necessity to observe, do and finally teach.

In Europe, this principle has developed into the model of "learning by doing", that is to say, an innovative learning plan where the surgeon acquires competences and experience in the operating room through daily surgical practice.

To select efficient learning models for young surgeon is a controversial topic:

the quarrel concerns the role of the trainers who can choose whether to monitor the young surgeons or help him to develop his reckoning and his gestures following the Socrates style.

Legal-medical issues, medical ethics but, mainly, the learning models selected by the University allow medical students to follow a gradual approach to surgery, from a basic practice of dissection and suture on realistic models to the experience on the human being.

Animal models may provide excellent examples to make practice; nonetheless, in our country, medical regulation forbids cadavers and animals vivisection;

Minimally invasive techniques has been a great advance in the history of surgery, but it requires special skills and techniques; that is why new and more modern educational models should be created.

University, being in charge to educate through the Postgraduate Schools the young doctors, should propose formative models suitable for these new necessities.

Nowadays, we are witness of deep changes in the

surgical field; on one hand, surgery has reached rewarding results for what concerns the pathologies' treatment; on the other hand, the surgeon must demonstrate technical and specialized competences to treat more complex procedures.

Modern learning models need to be improved through specific issues such as: the cultural upgrading and the accurate inspection of pathologies to determine the correct diagnosis; planning and clinical activity can help the fellow to acquire the precise therapeutic strategy; finally, the pertinence of the operating techniques and manual skills training.

Surgery is, at the same time, science and art where manual skills, exercise and technique have to merge together as premises to perform a surgical deed, whose reiteration assures safety and competence of the surgeon.

Since young doctors and qualified surgeons are not allowed to train and practice on cadavers and animals, it is necessary to join all the available resources as computer sciences, virtual reality and robotics.

General Surgery is definitely going through a mere revolution where mininvasive approach and new technologies generate a deep change in the operative procedures as in the clinical results.

As soon as this revolution began, the surgeon performing a laparoscopic cholecystectomy has to face with new procedures which he has not been trained to, causing lesions of the main bile duct. Although surgical competence is, theoretically, easy to achieve, excellence needs experience and daily practice. How should we train the young surgeon?

In the laparoscopic perspective, anatomy is the main topic which should be taught especially during the first training periods.

According to literature data, cadaveric dissection improves anatomic perception and spatial orientation that is why it is considered a valuable educational model for trainees.

The efforts aimed to improve modern technologies for teaching anatomy and surgical procedures simulation has given birth to a virtual reality (VR), a computer-based model involving the concepts of navigation, interaction and immersion.

Surgical training consists of developing cognitive, clinical and technical skills, with the latter traditionally acquired through mentoring in the operating theatre. Surgical simulation offers the opportunity for surgical trainees to practice surgical skills (mental practice and reinforcement) before entering the operating room and allows for detailed feedback (proximal and technical), and objective assessment of performance.

The simulator includes modules containing basic tasks and virtual patient cases projected to achieve skills that are essential to building confidence with laparoscopic surgery and becoming proficient in a variety of laparoscopic procedures.

Trainees can exercise their psychomotor skills, perception and spatial judgments based on virtual, anatomic and surgical environments.

The trainees action can be analyzed, errors identified and corrected, and performance scored under standardized, though not real, conditions.

In general, surgical simulation allows for the repetitive performance of a single task to allow the trainee to develop hand-eye coordination and motor skills before entering the real-patient setting.

Surgical competence encompasses a combination of requisite knowledge, technical

skills, cognitive skills, decision-making ability, communication skills, leadership skills,

and professional ethics.

Ability to perform and repeat gestures could be a revolution for the surgical training such as the synthesis between surgical model and simulation could improve the surgical efficiency itself.

Virtual devices can supply a high-quality learning curve, since they reproduce-simulate sudden and dangerous circumstances related to the human condition; the ability to practice a given gesture or procedure repeatedly will have a great impact on surgical training and education patterns.

It is clear that a perfect simulation of a real environment so complex and unstable such as the human body is not possible.

Simulated training allows trainees to practice the cognitive and technical skills of a procedure under

various conditions without the pressures of the operating room, and allows for the teaching of rare or unusual cases.

Ultimately, we must recognize the technological improvement offered by simulation, as instrument able to teach anatomy and to make perfect the surgical act since it can improve education and therefore our learning.

To raise the qualitative standard of the surgical education imposes continuous relationship and comparison with different technological and human realities to widen the scientific and cognitive targets as to underline the difference of the human resources available in this field.

According to the UE rules with reference to the free movement of doctors and the diplomas' mutual recognition, new laws regulating the postgraduate schools have been established in 2000. They define the new standards and the minimum requirements to be accredited, establishing the didactic programs and the training activities.

Efforts have been made in the Italian universities background to launch exchange information networks initiatives concerning scientific researches , to make homogenous the professional training, raising the qualitative and competitive standard through the strict cooperation with diverse Italian surgery schools. Informatics helped the integration of didactic programs coming from different surgical practices, the information exchange concerning laws and procedures, the spreading of new learning aids or videos regarding lectures and operations.

Further steps included spreading teleconference didactic where European and Mediterranean surgical schools can meet in order to realize a cultural and solidal bridge on behalf of internalization, research and acknowledgment.

The University of Catania is working in order to connect Europe and other Mediterranean countries, stimulating the internationalization of its formative offer and research activities organizing international masters in co-operation with foreign Universities.

In 2006, the University of Catania activated the first edition of the II level master in Mininvasive Surgery and New Technologies; a second edition of the master followed and the third was accomplished during the academic year 2008/2009.

The master was directed to foreign graduates in Medicine and Surgery, living in the Mediterranean Area, who needed to develop skills in general surgery and in mininvasive surgery procedures, provided that nowadays the majority of surgical performances (about 70%) are carried out using laparoscopic methods.

The master was directed to 12 participants and lasted 12 months for a total of 1500 hours articulated as follows: frontal lessons, seminar sessions, teleconferences, group work in operating room, simulating sessions and practical exercises (450 hours), Internship (400 hours), individual and team work, (500 hours), final written report (150 hours). At the end of the master, participants gained 60 credit points.

OBJECTIVES

Through an innovative teaching method, comprehending not only theoretical lectures, but also operating room group work, highly advanced technologies for simulation, teleconference, and practice, the master aimed to:

1. provide students with an adequate cultural support related to mininvasive surgery, its indications and limits, tinged principles to diverse surgery procedures, anesthesiology issues;
2. deepen the knowledge of laparoscopic surgical anatomy, necessary for the optimal fulfillment of diverse procedures;
3. favour the acquisition of specific competences in relation to equipment and technological supports;
4. provide with specific technical competences in relation to basic surgical procedures representing consolidated methods: through frontal lessons, seminars with video and following discussion, practical demonstration in operating room as well as didactic through simulators.
5. provide with an adequate cultural support on

advanced surgical procedures requesting an high level training. It was obtained through frontal lectures, seminars, visual supports and simulators.

6. provide with a knowledge of diverse technologies related to the specific field up to virtual reality and telemanipulation.

The admission requirements were a degree in Medicine and Surgery and a good knowledge of the English language.

Lessons have been held by experts in mininvasive surgery coming from the University of Catania and other Italian and foreign Universities. The master also contemplated sessions of internship at local and national qualified Institutions aimed at training participants in laparoscopic procedures involving both the operating conditions and experimental activities. Students will also acquire skills through simulated operating conditions laboratories in which the majority of surgical performances will be computer simulated.

As we know, today, there is very little in the field of medicine that has not been affected by new technology. We strongly feel the necessity to enhance professional skills and qualities. That's why our University offers this high – quality learning course to the Mediterranean basin countries. A strong relationship with the Universities of these areas has been created in order to develop a scientific and cultural link between different nations for program-based approaches to work together.

DOMENICO RUSSELLO:
russello@unict.it