

Surgical training, global surgery, and a generally applicable training model

by Margareta Berg, MD, PhD



Surgery has been used as a medical treatment for millennia, but the question about surgical skills and how to achieve them remains a matter of intense debate. Surgical curricula comprise a mixture of components aimed at covering all the surgical knowledge and skills necessary to conduct the clinical examination, diagnose diseases, make decisions about surgery, perform the operation, provide postoperative care, and handle surgical complications.^{1,2} Some attempts have been made to set standards for medical education.³

In the last 10 years, considerable focus has been on the use of simulation to help surgical residents and practicing surgeons become adept at performing specific techniques, such as laparoscopy and other specialized procedures.⁴⁻¹² However, to the best of my knowledge, no description of a simple, basic, and generally applicable training model has been published.

Traditional time-based training with trainer and trainee still dominates over competency-based surgical training, and advanced surgical simulators are available only to a fraction of the world's surgical residents.¹³ In addition, surgical training seldom includes

a firm predefined structure, and the local variation is huge.

The human anatomy is the same regardless of geography or socioeconomic status. Therefore, to have a sufficiently trained surgeon seems like a reasonable part of the Universal Declaration of Human Rights published by the United Nations in 1948.¹⁴ Many organizations today focus on “global surgery” by promoting access to qualified surgeons in underserved environments, often funded by industrial companies, scientific journals, or universities.¹⁵ However, the goals and the missions of these groups often vary widely, and different global surgery organizations seem to be competing. This led to the creation of the Surgicon Project.¹⁶

Surgicon

The Surgicon Project was initiated in 2010 as an independent, not-for-profit, scientifically driven global network focused on surgical training methodology. The co-founding group of Surgicon is listed in the sidebar on this page.

A key mission of the founders was to organize a new congress in surgical training, which took place twice in Sweden in 2011 and 2013. One of the first conclusions

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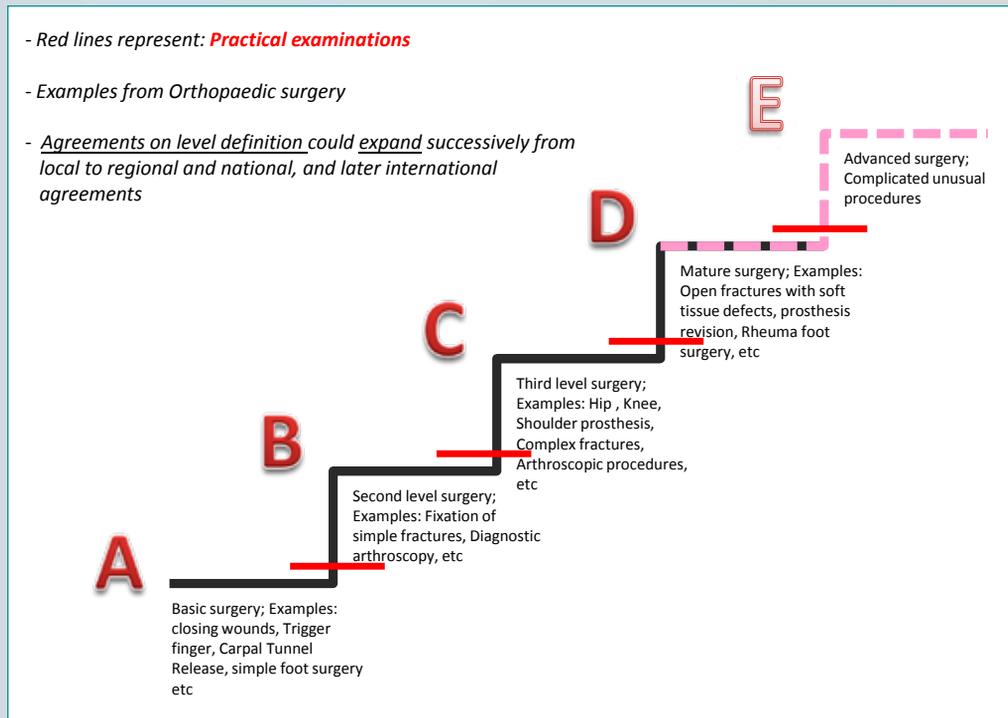
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FIGURE 1. THE SURGICAL STAIRCASE



at these congresses was the need for structured competency-based surgical training to replace the time-based training type. In 2013, the World Health Organization (WHO) invited Surgicon to collaborate, through the WHO Global Initiative for Emergency and Essential Surgical Care group.

Professor Gallagher and colleagues have shown that surgical skills can be measured.¹⁷⁻¹⁹ As a result of the Surgicon network, a new research group was formed to develop a scientifically validated surgical training model for an arthroscopic Bankart procedure by doing a series of randomized, prospective, and controlled scientific studies between 2012 and 2015.²⁰⁻²⁴ One of their conclusions was that the described method generally could be used in different kinds of surgery. However, the method includes the use of virtual simulators and

cadaveric training, which could be expensive and complicated to be applied universally. Despite the useful published data, the described methodology has yet to be accepted and implemented. In addition, the factor of practical examination during surgical training was not included in these studies, is generally seldom mentioned in the literature, and seems to be underestimated.

The generally applicable training method

A simple, generally applicable surgical training model is therefore suggested, where the simplicity in itself is regarded as a factor of importance for implementation. The method may be used in and adapted to multiple surgical specialties. The hypothesis is that such a basic model could easily be internationally accepted across

“borders and boards,” meaning across the borders of high-income and low-income countries, as well as across surgical societies. It should be emphasized that any form of competition between organizations to take ownership of different surgical curricula is regarded as counterproductive when aiming at international agreements and standards. The aim of this model is to train new surgeons in a stepwise fashion, to obtain internationally equalized and comparable surgical skills.

The generally applicable surgical training model is illustrated by a staircase, here with four suggested competency levels (see Figure 1, this page). The steps could be smaller, and more levels can be added eternally. The red blocking lines in the staircase image represent the factor of practical examinations, meaning that an examination is necessary, to pass on to the next level.



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The content of the staircase steps are unique to each surgical specialty. Consensus regarding the definition of difficulty levels could initially be made between a few surgical societies of one specialty, or regionally, and could later be expanded to include more surgical organizations successively. In this way, the work toward an international standard for equalized surgical skills levels may start and slowly proceed.

A structured system like this might also have an impact on surgical quality. As a comparison, it is well known that the very registration of surgical infections will reduce the infection rate. The introduction of stepwise and mandatory practical examinations might therefore be helpful, just by their existence. Simultaneously, this model would create higher security for both trainer and trainee, as both parts would know the defined goals and what to expect at each step of the staircase.

Intentionally, the steps have no time limit. Some of today's excellent surgeons have had a long learning curve, and some trainees will learn specific procedures in a shorter time. Some surgeons might specialize and get a license for steps A, C, and E (for example, spine surgeons). There is also a belief that such a model could shorten the total training period, as the very structure might reduce time gaps when residents are just hanging around.

How can practical examinations be performed?

The crucial factor in this model is the stepwise practical examination necessary to proceed to the next level. The model does not state the exact form of the examination. Any kind of examination process might be used, and each training center needs to define the process from the start. It might, for example, be a live surgical procedure performed in front of two examiners or recorded on a video that is then reviewed by, say, three experienced surgeons or surgical assistants. As Gallagher, Angelo, and Pedowitz

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have observed, a surgical procedure could be divided into a number of mandatory steps.¹⁷⁻²⁴ Using these steps as a checklist, it would be easy to confirm whether all steps were completed, either live through examiner dictation to a scribe in the operating room or through video replay. The actions taken to complete the steps are described as neither good nor bad; only indicated is that the mandatory steps were completed.

To qualify as an examiner it is suggested that steps A, B, C, and D have been passed, but for practical reasons, local variations would be permissible. In some cases, experienced surgical assistants have been used to check such surgical videos.

In this context, written surgical reports are likely to be replaced by videos in the not-too-distant future. Such a development supports the staircase model with systematic video examinations, which could increase both the patient's safety and trainer and trainee confidence.

Validation

The staircase model needs to be scientifically validated in different ways, and could be used as a tool for scientific studies comparing the development of surgical skills among residents trained in a traditional way (time-based) or after this model (competency-based). The possible time-saving effect of the suggested training model might be studied, as well as other aspects.

Conclusion

The described stepwise surgical training model can be used for any kind of surgery. One crucial factor is mandatory practical examinations of the obtained surgical skills, to be allowed to pass on to the next level. The model is the result of 30 years of observation of lacking structures in this domain and of the costs to society for avoidable surgical complications. ♦

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