

## TEACHING SURGERY TO MEDICAL STUDENTS

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*Instructing medical students in the field of surgery relies on the practicing clinical surgeon taking on the teaching responsibility. As the time allocated for students' surgical rotations diminishes, the volume of surgical information to share and the technical abilities to cultivate continue to grow. This article aims to support surgeons who have limited formal training in teaching techniques to improve their instructional abilities. Traditional methods such as large-group lectures, smaller group discussions, and mentoring are examined, with a particular focus on medical simulation.*

**INTRODUCTION.** In the United States, the training of aspiring doctors involves a four-year phase known as medical school. Typically, the initial two years are dedicated to imparting foundational science knowledge, while the subsequent two years focus on clinical education. According to this framework, surgery is formally taught in the third year, with duration varying from six weeks in some institutions to twelve weeks in others. Given the significant advancements in medical understanding, surgical technologies, and complex operative techniques, educating medical students in surgery during this brief timeframe poses a substantial challenge. To address this, surgical educators need to (1) set clear, achievable learning goals for students during surgical placements, (2) utilize established, effective teaching approaches, and (3) adopt innovative methods where they may be beneficial. Most importantly, due to the impossibility of creating a comprehensive curriculum, it is essential for surgeons to illustrate and initiate a commitment to continuous learning and develop the necessary skills.

The duty of instructing medical students in surgery predominantly falls to practicing surgeons, who often have limited or no specialized training in educational techniques and strategies. Educators tend to replicate the methods of their own training. Furthermore, surgical teachers vary from highly regarded professors in esteemed academic environments to rural surgeons who possess extensive hands-on experience and valuable insights not typically available in conventional surgical literature. This chapter aims to examine contemporary educational techniques and strategies, encourage surgeons to contemplate their personal teaching approaches, and offer various instructional options that can be integrated into their unique academic surgical environments. As mastering the art of surgery necessitates the acquisition of technical skills, emphasis will be placed on simulation-based training approaches.

The students whom we are fortunate to teach have achieved great success in their undergraduate studies. Furthermore, they have dedicated considerable hours to community service, engaged in various extracurricular pursuits, and frequently participated in scientific research initiatives. Modern medical students possess effective knowledge of technology that enhances their learning experience. Educators can leverage this technological proficiency when sharing knowledge and technical expertise with students. Conventional teaching methods that focus on delivering information through lectures, which can be seen as passive learning, may be innovatively transformed into strategies that foster student engagement within the learning process, referred to as active learning. Medical students should be motivated to take initiative in their education by setting personal goals and selecting their preferred learning styles, which is known as self-directed learning. The support these learners receive at the outset of their education can gradually diminish, encouraging them to take greater responsibility for their learning journey, a concept known as scaffolding. Ultimately, the individual student, and later the physician, will be responsible for determining the content they wish to learn and the methods they will use for continuous education.

Surgeons engage in teaching across various environments. The environment typically affects the size of the group of learners, and this, in turn, shapes available teaching methods. Group sizes can be easily categorized based on the number of students: a mentorship group consisting of 1 to 3 students, a small group ranging from 4 to 25 students, and a large group comprising more than 25 students. The mentorship group is well-suited for direct instruction in settings such as clinics or offices, at the bedside or during rounds, in operating rooms, or in procedure areas like endoscopy suites. Small-group instruction generally takes place in

intimate classrooms, simulation labs, and more casual venues such as cafeterias, faculty residences, or locations off-campus. The large group typically convenes in traditional lecture halls or amphitheatres.

The traditional approach to medical training remains characterized by large cohorts of students gathered in expansive classrooms. While these sessions often lack significant interaction, it is still possible to convey surgical knowledge effectively to students while optimizing the use of faculty time. Large-group lectures are likely to persist in the future, as continuing medical education takes place in extensive convention venues featuring a single educator or a panel instructing numerous participants.

While the large-group format may not be ideal for honing technical skills or encouraging problem-solving abilities, it can effectively facilitate the straightforward sharing of information from the surgical instructor to the medical students. There are various strategies that any surgeon, even those without formal teaching qualifications, can apply to improve both the creation and presentation of their lectures. Important concepts to keep in mind when preparing lecture material include objectives, relevance, reinforcement, and summary. Objectives should be specific and clearly articulated at the lecture's onset, and they must be feasible given the time available. One should ask, what insights do I hope students will gain by the conclusion of my presentation? To stimulate student engagement, it is beneficial to outline the importance of the topic early in the session. Since typical student attention spans diminish after about 15 minutes, providing brief reinforcements every 10 to 15 minutes is advisable. Lastly, concluding with a practical summary helps reinforce the information shared.

For instance, envision a one-hour lecture on fundamental proctology aimed at a hundred third-year medical students. The specified objectives might be as follows: By the end of this session, you will (1) identify 10 common anorectal disorders affecting patients, (2) articulate how these patients typically present clinically, and (3) grasp the pathophysiological foundations behind the exhibited symptoms. The significance ("why learn this") could be communicated as: The time allocated to proctology in medical education is quite limited, yet most physicians across various specialties are likely to encounter these patients. Reinforcement of the discussed anorectal disorders can effectively be achieved through the inclusion of surgical or clinical images placed throughout the presentation. The summary should underscore that for many anorectal issues, a clinician can often make a straightforward diagnosis simply by listening to the symptoms, recalling



fundamental anorectal anatomy and physiology, and recognizing typical examination findings.

The aim of conducting an effective lecture for a large audience is to capture the audience's attention. Strategies to engage your students might involve incorporating humor, addressing students by name whenever possible, conducting audience polls with a show of hands, moving around the lecture area, and making eye contact with students rather than focusing solely on the projected material. Most crucially, displaying enthusiasm for your subject matter is vital during your presentation!

The traditional approach to medical training currently involves sizable groups of learners in expansive lecture halls. While interaction is often minimal or absent, surgical expertise can be successfully imparted to students, effectively making the most of faculty time. The experience of attending large lectures is likely to persist for students as ongoing medical education takes place in extensive convention venues, where one or multiple instructors present information to hundreds of attendees.

Although a large group setting may not be the best format for developing technical and problem-solving abilities, it can effectively convey information from a surgeon-instructor to medical students. Surgeons, even without formal teaching credentials, can apply various strategies to improve the preparation and presentation of their lectures. Key concepts to keep in mind when crafting lecture content include objectives, relevance, reinforcement, and summarization. Objectives should be precise, clearly articulated at the lecture's beginning, and achievable within the given timeframe. It is crucial to consider what you hope students will take away from your presentation. To engage your learners, it is beneficial to explain why the topic matters early on. Given that student concentration typically wanes after 15 minutes, providing brief reinforcement every 10 to 15 minutes is essential. Ultimately, offering students a practical overview at the conclusion can help solidify the information conveyed.

For illustration, think about a 1-hour presentation on fundamental proctology aimed at 100 third-year medical students. The objectives (what students will learn) could be outlined as follows: By the end of this session, you will (1) identify 10 common anorectal issues faced by patients, (2) describe how patients typically present their symptoms, and (3) grasp the underlying pathophysiology related to these symptoms. The relevance (the reason for learning) could be highlighted like this: Although the amount of time spent on proctology during medical education is minimal, chances are high that most doctors in various specialties will come across these patients. Reinforcement of the discussed common

anorectal conditions can easily be achieved by incorporating surgical or clinical images at various points during the presentation. The summary should highlight that in numerous anorectal cases, a clinician can accurately diagnose a specific condition by attentively listening to the symptoms, remembering fundamental anorectal anatomy and physiology, and recognizing key examination findings.

The aim of conducting a successful large-group lecture is to captivate the audience. Several strategies for engaging your students may include incorporating humor, calling on students by name when feasible, gauging the audience's opinions through hand raises, moving throughout the lecture space, and keeping eye contact with students rather than staring at the slides. Most importantly, your presentation should reflect genuine enthusiasm for the subject matter!

Training that utilizes simulation has proven to be an efficient method for instructing individuals in both technical and interpersonal skills within a secure and unthreatening setting. The idea of using simulation as a training tool is well established in the military, such as in flight training simulations, as well as in sports like golf through simulators; its use is rapidly growing in the field of medical education. In this context, medical simulation refers to the imitation of actual medical scenarios through a constructed model aimed at teaching or assessing skills. This scenario could involve a patient interaction, a specific situation, or a medical procedure. The constructed model utilized in this process is the simulation itself.

### **Conclusion**

As surgeons who generally lack systematic training in teaching approaches, it is our duty to instruct learners who are exceptionally intelligent, highly driven, and deeply engaged with technology. We are tasked with imparting surgical knowledge, guiding decision processes, and developing technical abilities in medical students, all while exemplifying professionalism and ethical standards. Our mentees have clearly expressed that they expect medical students to carry out a surgical consultation, provide preoperative guidance, grasp fundamental surgical procedures, and manage postoperative care while being mindful of possible surgical issues. These goals can be accomplished through conventional teaching techniques along with innovative and creative strategies like medical simulations. Beyond our teaching responsibilities, we must exhibit a commitment to continuous learning, as we are perpetually in a state of learning ourselves.

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