

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

Section Editor: Klaus Mergener, MD, PhD, MBA

## Efforts to Support Effective Teaching in Endoscopy



Jonathan Cohen, MD  
Clinical Professor of Medicine  
New York University Grossman School of Medicine  
New York, New York

### G&H What are the current macro trends in gastrointestinal endoscopic training?

**JC** The first major trend is a wider acceptance of education to the point of competence. This idea ties in with some of the other trending areas, namely, the application of milestones to endoscopic training and the use of objective assessment tools not just for a test at the end of training but as formative tools during training (eg, to give individuals feedback as to what they are doing well or what they need to work on and what progress they are making). The second major trend is teaching endoscopy teachers how to teach well, applying core educational principles.

### G&H What learning environment barriers are impacting endoscopic training?

**JC** The number one barrier would be time constraints for teachers because of busy clinical workloads. Also, the volume of procedures required for service in places where fellows are being taught is large and growing. In terms of tracking learners' progress, there are some limitations. If a teacher is objectively measuring a skill on a sequential basis, then ways of keeping track of that data for trainees and for teachers alike are not as mature as they could be or as they are, for example, in the United Kingdom. Another barrier would be lack of consensus and standardization of the way gastrointestinal (GI) endoscopy is taught. It may vary considerably not only from program to program but also within a program from individual to individual.

### G&H How can endoscopy training programs support effective teaching?

**JC** The easiest way to better support endoscopy training would be for every program to have a meeting of the

endoscopic teachers at the beginning of each year to talk about how they are going to teach endoscopy to somehow standardize it. Of course, there may be nuances, where teaching styles differ, but there should be some common nomenclature and common agreement as to how to approach teaching. This would include what principles to use, how to do assessments, and how often to assess trainees. From directing train-the-trainer programs both internationally and within the United States over the last 10 years, I have heard from the endoscopy teachers who attend that most of them never conduct such a meeting at their institutions. It would be a great start for endoscopy training programs to focus on standardization of their process.

Training programs also need to look at their training lists and decide which cases need to be done by a fellow. Perhaps certain blocks during the week are designated as a training session, and the list for that session will naturally take longer to complete. At other times, only endoscopists who are not being trained would perform procedures. Another option would be to have every other case performed by a trainee; in the alternate case, the trainee could watch the teacher to allow the endoscopy trainer to get through the day's clinical caseload. This puts patient safety and care first, but at the same time ensures that enough time is allotted for proper training and learning experience of the trainees, and they are not rushed.

### G&H What are some potential benefits with using simulators?

**JC** First, simulators allow the teacher and trainees to work together in a collegial and stress-free environment. All the focus is on learning, with no consideration about patient care. Second, using the simulator is fun. This is important because when the experience of teaching and

learning is fun, it is motivating, not just for learning at that moment but for learning throughout life. Third, to allow repetitive practice in general and with the chance to do so with some feedback, again, is a great opportunity. A fourth benefit is that using a simulator allows a teacher to break up a complex skill into separate components and teach each component. Simulator training can also be used to concentrate on team training, communication skills with assistants, and understanding of accessories. Many different lesson plans can be generated in the simulator environment tailored to the needs of the learner.

Incorporating simulator work in the early phase of fellow training has the potential to benefit patients as well, by shortening procedure time and reducing discomfort. The promise of simulators is that they could allow for independent learning to the point where less teacher time is needed or where learning curves could be shortened. To date, most of the data on simulators have not shown that they have greatly moved the curve to the left in terms of the number of procedures needed on average to become competent. The data show that simulators particularly among novices in colonoscopy improve the quality of the examination for the first 80 or so cases. Simulators help novices learn the hand-eye coordination of the endoscope and the basic skills. Certain simulators, especially virtual reality simulators, also have the potential to teach cognitive skills such as lesion recognition.

### G&H What are some of the challenges?

**JC** In some respects, one of the challenges with simulators is that they are not complex enough for more advanced fellows. Especially with some of the plastic models or computer simulators for colonoscopy, the cases are not that hard to do. Alternatively, some simulators are best reserved for trainees who can demonstrate mechanical skill handling the endoscope and manipulating accessories. For example, the trainee taking an animal-model simulation course on endoscopic mucosal resection (EMR) who lacks basic hand-eye coordination skills will be wasting a lot of time, effort, and resources that go into setting up a hands-on laboratory. Instead of being able to work on the intricacies of performing the procedure, the trainee is still working on getting the endoscope in control and in a good position. Any simulator-based educational activity needs to be tailored to the level of the trainee.

Cost is a big issue with computer simulators, and access is limited. Plastic inanimate models are relatively inexpensive, and recent models designed by accessory manufacturers allow for practice of several endoscopic therapeutic techniques. The ex-vivo animal tissue explant model simulators are portable and the most versatile for teaching interventional procedures. Trainee access to

animal model simulators has increased exponentially since their introduction by Juergen Hochberger and colleagues in the mid 1990s, and endoscopists in practice have been able to get hands-on experience with models at national conventions, in exhibit areas, and at short workshops, which are offered at regional and national meetings such as Digestive Disease Week (DDW) every year and are often sold out. More in-depth skills training incorporates these simulators in dedicated weekend courses, such as the American Society for Gastrointestinal Endoscopy (ASGE) Institute for Training and Technology (ITT) courses, which include focused programs on advanced procedures such as endoscopic retrograde cholangiopancreatography (ERCP), EMR, peroral endoscopic myotomy (POEM), and endoscopic mucosal dissection (ESD).

Animal tissue explant models are also now feasible for teachers to use locally at their home hospitals. Simulator platforms and frozen animal tissue can be shipped to local institutions, and a hands-on session can be conducted by a local expert. This requires a teacher familiar with teaching on the model, time in the institution's endoscopy unit or simulator center, and support from industry to provide animal-use endoscopes with accessories and to cover costs of renting the simulator. Although there is more of a logistical issue with the animal models than with the plastic simulators, it is not insurmountable. With increased accessibility to more programs, especially locally, and some national organizations leading the way by incorporating simulators into the fellows' training process, familiarity with simulators has been increasing. I foresee them becoming more integrated into training over the coming years.

### G&H How might simulator-enhanced training be incorporated into endoscopy teaching?

**JC** Simulators may have a role at different time points for trainees from when they start to when they are in practice. For comparison, the airline industry has multiple simulators with increasing levels of complexity that trainees need to get rated on before progressing to the next level or the more complex plane. For endoscopy, the idea would be to introduce novices to either plastic models for hand-eye coordination or, when available, computer simulators to get used to the dials and the feel of an endoscope and torquing and some of the basic terminology involved. During fellowship, the ex-vivo model is quite good. The first-year fellows' course, which has been run since 2004 at the ITT in Downers Grove, Illinois through the ASGE, gives fellows who have had some hands-on training with endoscopes their first experience with animal-model work. The fellows learn basic precision skills with accessories and a few basic techniques that they would then use back home with their mentors in real, one-on-one proctored

cases. At the ASGE, there is a hands-on simulator-based course for late second-year and third-year fellows to work on more interventional techniques. There is also a course for fourth-year fellows who want to practice some advanced skills they are learning in their programs. These courses are not replacing standard education. In fact, they are totally complementary and, in a structured way with certain learning objectives, tailored to where fellows are in training. Similarly, doctors in practice can use a simulator to practice skills they know but want to improve or to try a new accessory. They can do that at a hands-on demonstration or an intensive 3-hour workshop at DDW, or they could attend a dedicated course.

For procedures that take considerable time and practice to master, simulators have been incorporated into longitudinal formal curricula. The ASGE STAR (Skills, Training Assessment and Reinforcement) Certificate Program contains didactic instruction and self-assessment followed by an intensive simulator-based hands-on weekend course working with experts in small groups. Participants receive one-on-one instruction by experts, time spent in deliberative practice with direct feedback and assessment in a formative way on how to improve, and then a summative assessment to see how they are in terms of their skills at the end of the sessions. As an example, doctors who have done some simple colon saline-lift polypectomies but want to get better at EMR and be able to handle larger lesions have taken the curriculum.

In these ways, simulators have a role for remedial work to refresh old skills or to learn new skills within practice, and different models may work better for different types of training.

### **G&H** How does one know when a level of conscious competence is obtained?

**JC** Conscious competence is a key principle in most train-the-trainer programs and is emphasized in the ASGE's white paper on principles of endoscopic training. This has to do with developing keen self-awareness and situational awareness. As a fellow learns to perform endoscopy, the first stage (conscious incompetence) is to develop an understanding of what he or she does not know or has difficulty doing. This is key to knowing what problems must be solved and what skills to practice to progress in ability. A teacher needs to be able to diagnose the problem as well as understand the maneuvers required to solve it and the terminology needed to convey precisely what to do. Over time, the fellow learns to think through the steps needed to complete a task successfully (conscious competence). In practice, the skill eventually becomes second nature (unconscious competence).

To become consciously competent, the teacher must

question and test oneself. When performing a colonoscopy, to refresh my conscious competency skills, sometimes I dictate to myself what I am doing. Trainees cannot do that because they will be thinking too much about performing the procedure and may have cognitive overload, which is a formidable obstacle to learning. Rather, a teacher must have them stop, think about what they need to do, and then have them do it. For a teacher, the process of becoming consciously competent requires practice. A simple exercise the trainer can do is close their eyes and tell a family member how to tie their shoelaces using just words. The trainer who can do that has the verbal precision demonstrating they are consciously competent in tying shoes as opposed to just doing it, where they do not think about it. This may be a helpful exercise for a trainee as well, learning for the first time to be consciously competent.

### **G&H** What are the challenges related to competency-based assessment?

**JC** Certain procedures (ESD, POEM, some endoscopic bariatric therapies) do not have validated competency tools yet. A good assessment tool for competency is a measurement of skill on a direct observation that is a predictor that the trainee being evaluated is likely to be able to perform the procedure independently at a desired benchmark level of performance. The ultimate judge of competency is not a score on a test but rather the quality of performance that one goes on to achieve in actual patient care. The idea of tracking a trainee's skill during and after training and benchmarking is also important and tied into competency-based education. In addition to having validated tools for some of the newer techniques, there is a need for better methods of tracking data that allow physicians to follow the data over time and compare and benchmark data to peers in the community. There are good mechanisms, for example, of tracking data in colonoscopy. Figuring out the logistics of being able to track performance within programs without overburdening teachers and trainees (eg, how often to track performance and how to make tracking seamless) are some of the challenges to competency-based assessment.

### **G&H** Should all endoscopy training include teaching of advanced procedures?

**JC** All endoscopy training should have teaching to exposure. A trainee who does not intend to perform advanced procedures in practice still needs to know about them and see some actual cases to understand adequately the indications, complications, and patient experience. Such training exposure is also important even for early fellows still deciding on a career path. It is difficult to commit to

learning advanced endoscopy or foregoing that until one has such exposure. On the other hand, if trainees are going to learn to perform ERCP, then they should learn it to achieve competency.

### **G&H** How should one reconcile the different requirements for GI endoscopy in surgical and gastroenterology training programs?

**JC** First and foremost, it is important that regardless of which specialist is performing the endoscopic procedure, patients ought to have a similar quality examination and the quality of the examination should meet the same objective performance standards for a trained person who is credentialed at a facility to perform the procedure. If there is one level of procedure quality offered and everyone who is qualified to perform the procedure can demonstrate performance metrics that meet this standard, then the doctor's specialty and the route to achieve that level of procedural skill should not matter.

The idea that trainees in one specialty learn endoscopy faster than others has not been proven for a particular procedure, like colonoscopy, using the same gold-standard assessment tool. It is known that individuals learn at different rates. I think the goal is to agree on what the practice performance standards are for a procedure—to define what a high-quality examination entails and develop a standard tool that could be applied when every trainee, regardless of specialty, is being assessed to meet it. Ultimately, however, the idea that the initial credentials to perform a procedure ought to be followed by supplying real data on the physician's outcome at a point in the future is another area for common ground. This ensures that only doctors who are competent to perform procedures continue to do so, which is good for both surgeons and gastroenterologists who perform endoscopy.

There is also an idea of preparing for success. If the preponderance of data shows that a doctor needs to perform 100 sphincterotomies in native papilla to become competent in ERCP, but then a program offers an assessment for competency after someone has performed 10 sphincterotomies, I do not see how that is possible or can be justified. While procedural numbers do not guarantee competency and do not suffice to measure it, a minimum number of proctored training examinations are required before most trainees reach adequate skill level to perform that procedure at an accepted minimum quality standard. For colonoscopy that would relate, for example, to cecal intubation rates that meet accepted quality benchmarks. Typical gastroenterology fellows have more than enough experience in colonoscopy to achieve this. For general surgery programs that do not have enough actual colonoscopies for every trainee to develop competency even

with simulator supplementation, this poses a challenge. The concept of tracking so that those trainees who might expect to perform a particular endoscopic procedure in their area of intended clinical practice would get to do most of the available training cases and those expected never to perform endoscopy in their subspecialty practice to forego much or all endoscopy training is a possible solution. This remains an unresolved issue, but if demonstrating procedural skill to a common standard remains the requirement of credentialing, then ultimately patient care will be high quality.

I also think it is not sufficient to use a simulator as an assessment tool unless that simulator has been validated against performance in actual procedures. So far, most direct observations of endoscopic performance tools do predict future outcome in real procedures, and that is why they should be the gold standard for assessing competency.

### **G&H** How would you advise endoscopists who wish to develop their teaching abilities?

**JC** First, I would encourage them, and then ask them to have some conversations within their own GI divisions in terms of faculty development and improving the quality of teaching within their program. They could attend some of the growing number of train-the-trainer workshops and programs. The ASGE has done programs at DDW the past several years. I have been involved with the World Endoscopy Organization program for endoscopic teachers since its inception almost a decade ago. It has done over 14 two-day programs in various countries, including 2 sessions that have taken place in the United States in Chicago and in New York. The World Gastroenterology Organization has done train-the-trainer programs around the world as well. In Canada and the United Kingdom, workshops and train-the-trainer programs have proliferated at the local level. I would also highly suggest that interested teachers attend these programs with their colleagues and read through the growing body of literature on this topic.

#### **Disclosures**

*Dr Cohen has no relevant conflicts of interest to disclose.*

#### **Suggested Reading**

Cohen J. Advances in training for advances in endoscopic therapy. *Gastrointest Endosc.* 2020;92(5):1026-1029.

Cohen J. Simulation training in endoscopy. *Gastroenterol Hepatol (N Y).* 2008;4(1):25-27.

Walsh CM, Cohen J, Woods KL, et al. ASGE EndoVators Summit: simulators and the future of endoscopic training. *Gastrointest Endosc.* 2019;90(1):13-26.

Waschke KA, Anderson J, Valori RM, et al; Chair of 2017-18 ASGE Training Committee. ASGE principles of endoscopic training. *Gastrointest Endosc.* 2019;90(1):27-34.