

Association of Surgical Education

From novice to master surgeon: improving feedback with a descriptive approach to intraoperative assessment



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KEYWORDS:

Assessment;
Feedback;
Skill;
Surgical education;
Intraoperative
development;
Teaching

Abstract

BACKGROUND: A developmental and descriptive approach to assessing trainee intraoperative performance was explored.

METHODS: Semistructured interviews with 20 surgeon educators were recorded, transcribed, deidentified, and analyzed using a grounded theory approach to identify emergent themes. Two researchers independently coded the transcripts. Emergent themes were also compared to existing theories of skill acquisition.

RESULTS: Surgeon educators characterized intraoperative surgical performance as an integrated practice of multiple skill categories and included anticipating, planning for contingencies, monitoring progress, self-efficacy, and “working knowledge.” Comments concerning progression through stages, broadly characterized as “technician,” “anatomist,” “anticipator,” “strategist,” and “executive,” formed a narrative about each stage of development.

CONCLUSIONS: The developmental trajectory with narrative, descriptive profiles of surgeons working toward mastery provide a standardized vocabulary for communicating feedback, while fostering reflection on trainee progress. Viewing surgical performance as integrated practice rather than the conglomerate of isolated skills enhances authentic assessment.

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Since the first formal American surgical training program was instituted in 1889, surgical trainees (originally

called “residents” because they literally lived in the hospital) have dedicated themselves to learning the practice of surgery through immersion and experience.¹ Over a century later, guiding trainees to independent practice of surgery is now subject to numerous external pressures, including maximizing efficiency, duty hour restrictions, and ever stricter patient safety goals. Although a technological explosion, from single-incision laparoscopy to robotic surgery, has occurred, surgical residents now log fewer cases than they did before the implementation of duty hour restrictions.²

The authors declare no conflicts of interest.

This abstract was presented at the Association for Surgical Education Annual Meeting on April 11, 2014, Chicago, IL, and was selected as a Paper of Distinction.

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Manuscript received November 17, 2014; revised manuscript March 4, 2015

With opportunities to participate in the operating room at a premium, improving constructive feedback has been targeted as an opportunity for making those experiences as meaningful as possible.³ The Accreditation Council for Graduate Medical Education (ACGME) includes formative feedback in daily practice patterns as a key component of practice-based learning and improvement, but developing assessments that provide meaningful intraoperative guidance continues to be a challenge in the field of surgical education.⁴⁻⁶

Currently available assessment tools in surgery are useful for providing judgments of overall performance (faculty ward evaluations, objective structured clinical examinations, and intraining examinations⁷) or technical skills (eg, objective structured assessment of technical skills⁸ and hand motion analysis⁹). DaRosa et al¹⁰ recently proposed a theory-based assessment model for operative performance (the “Zwisch” model) based on increasing degrees of autonomy experienced by the trainee surgeon. The “Zwisch” model makes the key assumption that observable behaviors represent cognition. All of these assessment frameworks, valuable though they may be for judging performance, provide marginal basis for dialogue that will truly elicit how a trainee is thinking and direct future improvements. In a systematic review of tools for assessment of procedural skills, Ahmed et al found that none of the reviewed studies measured educational impact or “extent to which test results and feedback contribute to improve the learning strategy on behalf of the trainer and the trainee.”¹¹

To bridge the current assessment gap, this study sought to better understand how it is that people learn to practice surgery. More specifically, the study sought to characterize the developmental trajectory of surgeons from the perspectives of surgical educators themselves and to outline the key stages along it.¹² Our data directed the construction of a descriptive assessment tool for intraoperative performance, which affords educators and trainees a common language for communicating clear directions from one stage to the next. This work seeks to introduce meaning about the practice of surgery where it is most needed: on the ground, in day-to-day interactions between teachers and learners in the operating room.¹³

Methods

This was a qualitative, interview-based, theory-informed grounded theory study in which participants were surgeon educators practicing at an academic institution. Researchers were two surgeon educators without formal education training, two surgeons with formal degrees in education, and one nonsurgeon educator with a formal degree in education.

We conducted video and audio recorded, semistructured interviews with surgeon educators who regularly work with residents, to probe their understandings of surgeons’ developmental trajectories. Surgeon educators were chosen

because their responsibilities for teaching residents would likely make them more reflective about surgical development. Participating surgeons were approached and consented to being interviewed after an approved institutional review board–exempted process. One surgeon interviewer trained in inductive interviewing conducted the hour-long interviews using a written protocol. Interviewees described end points (what they consider to be the characteristics of a beginner and what they consider to be the characteristics of an experienced surgeon), then characterize how learners are thinking in the operating room at the various stages along the developmental trajectory. All the interviews were transcribed for analysis.

We approached data analysis from a theory-informed grounded theory perspective; analysis began after the first three interviews, proceeded concurrent to data collection, and was iterative.¹⁴ The main body of theory influencing our analysis arises from the conceptual framework for expertise by Dreyfus SE and Dreyfus HL,¹⁵ which describes the integrated development of “embodied cognition,” or cognition which is inseparable from physical performance.¹⁶ This “expertise” literature describes the trajectory that learners of any skill travel along, as they move from reliance on abstract principles, through accumulation of experience with situational aspects, to intuitive practice.

To develop a coding schema, two researchers separately coded initial transcripts on a line-by-line basis, and then came to concurrence on an initial code set to represent participants’ descriptions of the developmental trajectory of surgeons. As we coded the remaining transcripts, additional codes were added and defined as necessary, and codes were grouped around themes. Concurrent analysis allowed us to perform member checking to see how later participants reacted to the emerging theory. Finally, the entire research team, with its diverse viewpoints, arrived at consensus on a model for developmental trajectory that was used to design narrative descriptions for each stage.

Results

Participant demographics

Twenty surgical educators were approached and participated in the study (2 surgical educators who were approached could not be scheduled before the goal number was reached and, therefore, did not participate); they represented general surgery and the subspecialties of cardiothoracic, colorectal, endocrine, hepatobiliary, colorectal, pediatric, transplant, trauma, and vascular surgery. The interviewees had experience ranging from 2 to 33 years in practice (mean = 17, standard deviation = 9.6) and represented a variety of practice settings (large academic institution, county general hospital with a large indigent population, health organization, private hospital, and Veterans Administration hospital). Four of the interviewees were women.

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