

The Briefing, Intraoperative Teaching, Debriefing Model for Teaching in the Operating Room

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The need for a more deliberate approach to operating room teaching becomes more imperative as duty hour restrictions limit the exposure residents have to the operating room. A good model for deliberate teaching in the operating room would focus the teacher on setting objectives for the learner's performance, providing immediate and specific feedback, and providing guidance for future practice. The ideal model would allow surgeons to achieve these educational goals within the context of their already existing practice. We propose a model for teaching in the operating room that fosters good educational practice, takes advantage of the naturally existing observation and teaching opportunities available to the teaching surgeon, and fits easily into the surgeon's existing routine.

Surgical residency, as Atul Gawande¹ described it, continues to depend on "the wonderful, time-honored, throat-constricting method of learning-by-doing on the job training . . ." Reznick and MacRae concurred,² stating that volume is the hallmark of surgical training. "Learning by doing" rests on the belief that experience alone will lead to learning. This is a pure discovery model of learning, premised on the idea that through practice and self directed learning, students will develop appropriate rules and understandings to guide future practice. Mayer³ made the convincing case that pure, unguided discovery learning is ineffective and inefficient, does not guarantee that students will even come in contact with the needed learning opportunities, and does not guarantee that students will learn the rules that guide future practice. He reviewed three lines of research in which students were called on to learn, either through pure discovery learning or through guided discovery learning. In guided discovery learning, an expert provides the novice with preparatory information before the experience and offers verbal and perhaps manual guidance during the experience and feedback afterward. In each case, the students using guided discovery learning learned more quickly, more accurately, and were more likely to remember

what they learned, than those who used pure (unguided) discovery learning. The learner's experience in surgery more closely approximates pure discovery learning than guided discovery learning. We believe this can be changed with relative ease.

Guided discovery learning partners well with deliberate practice to improve performance. As defined by Ericsson,⁴ deliberate practice entails focusing on a particular aspect of performance to improve; receiving detailed, immediate feedback on the performance; and having multiple opportunities to practice the performance. Although the "learn by doing" approach allows multiple opportunities for practice, without the focus and the feedback, learning will be haphazard at best.

Empiric evidence suggests that teaching in the operating room happens with less frequency and less deliberation than would allow optimal learning. For instance, Scallon and colleagues⁵ found that teaching about clinical patient-related material occurred in fewer than 50% of the 60 cases observed, and that this teaching tended to cover patient history, physical signs and diagnosis, and complications. Teaching often did not include discussions of operative planning or the surgeon's experience with the condition in the past. There were also times, for instance, during closing or in the recovery room, when no interactions occurred between attending and resident or between residents.

Roberts and colleagues⁶ determined that although there are numerous interactions within the operating room that can be categorized as teaching interactions, they have three defining characteristics. First, they are focused on getting through the operation efficiently and effectively. Second, didactic information is offered in an opportunistic fashion, with events in the operation triggering "teaching scripts."⁷ Third, as a result, the effect on learning is likely to be limited by the diffuse nature of the stream of advice or "bon mots" issued without a focus. These three features pose difficulties for the learner. For instance, given the limits of human attentional capacity, it is difficult to predict what the learner would identify as specific learning points from the series of interactions. As a result, the unfocused stream of talk is unlikely to lead to a permanent change in the learner's behavior.

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room. A good model for deliberate teaching in the operating room would focus the teacher on setting objectives for the learner's performance, providing immediate and specific feedback, and providing guidance for future practice. The ideal model would allow surgeons to achieve these educational goals within the context of their already existing practice.

We propose a model that fosters good educational practice and takes advantage of the naturally existing observation and teaching opportunities available to the teaching surgeon. We developed our approach using existing models of teaching practice. For instance, briefing and debriefing are commonly used in training fighter pilots⁸ and can be used in the surgical suite. Our model of intraoperative teaching modifies existing approaches⁹ by focusing on what emerges from the briefing. We propose a structured, brief approach to debriefing derived from a familiar approach to teaching in the ambulatory setting.^{10,11} Expanding on concepts in cognitive psychology on how long-term memory is organized, stored, and retrieved,¹² we propose that the learner be actively involved in creating learning objectives and proposing how instruction might be extended to future practice.

After the example of the 1-Minute Preceptor, our quest was to create a model for teaching in surgery that would fit into the constraints of an attending surgeon's practice, would be acceptable to surgeons, easy to remember, and easy to enact. To ensure that good teaching occurs without requiring additional time from the surgeon, we make educational use of two events that bracket any operation: a few minutes at the scrub sink, and time spent closing. We describe each of the elements of the BID model (briefing, intraoperative teaching, and debriefing) along with its rationale.

THE BID MODEL IN USE

This section describes each of the elements of the BID model in detail and provides an example of the elements in use. Examples are derived from observations of surgeons using the BID model.

Briefing

This is a short (2- to 3-minute) interaction at the scrub sink. The purpose of the interaction is to assess the needs of the learner, to cause the learner to assess her own learning needs, and to jointly establish learning objectives to guide both learner and teacher. Ideally, the learner establishes her own objectives for the operation. The teaching surgeon assists by prompting and guiding the formulation of the objective. Having learners involved in setting the objectives allows them to begin the process of deliberately identifying

areas in which practice is needed, and deliberately reviewing past experiences to formulate needs to be addressed in the current operation. This process allows learners to integrate the experience into their semantic networks,¹² making it more likely that the information can be retrieved later.

The attending surgeon starts the conversation with a brief question about goals for the operation or previous experiences. Learning objectives can follow from this brief needs assessment.

Example

"Tom, you've probably done 100 laparoscopic cholecystectomies. What do you have left to learn in the performance of this procedure?"

"I want to work on my efficiency. I end up having to reposition the instrument in my left hand too often, so I want to work on positioning of the fundus grasper."

This briefing took place at the scrub sink, and took less than 5 minutes to accomplish. By setting objectives at the beginning of the operation, the preceptor served to focus the attention of the learner, and also created a mechanism to guide his own teaching during the operation.

Intraoperative teaching

The objectives set in the briefing focus the intraoperative teaching. Although other standard forms of intraoperative communication will still be present (ie, the attending physician will still coach and guide the learner through the operation), the focus of most of the didactic talk will be on the one or two learning objectives set for this operation. This ensures that the teaching is not simply a nonspecific flow of talk, but instead, discussion focused on mutually shared learning goals. Irby⁷ argued that, over time, medical teachers develop teaching scripts. The preceptor can still use teaching scripts, but those scripts are manifest in the briefing session and in the intraoperative teaching and are based on mutually developed learning objectives.

Example

"Tom, can you talk me through your decision-making process as you position your left hand? What will help you with your goal of working on efficiency?"

"I need to choose a spot with the left-handed grasper to be able to expose the triangle of Calot adequately, but still be able to see the other areas for dissection."

Later: "So how many times have you had to reposition your left hand?"

"Only three times—that's really good for me."

"That's great. What do you know now about how to do the initial positioning?"

“It needs to be low enough to be able to expose the triangle of Calot, but the positioning needs to allow me to start dissecting the liver bed without moving it too many times.”

Debriefing

After the operation is finished, ideally during the closing, the preceptor and the learner debrief about the encounter. The debriefing consists of four elements: reflection, rules, reinforcement, and correction. Because the debriefing is focused specifically on the intraoperative teaching, which is focused on objectives set at the beginning of the encounter, it is short. In our example, debriefing the learner during the closing took less than 5 minutes.

Debriefing begins with the attending physician asking the learner to reflect on his or her performance and attainment of stated objective. This allows the preceptor to understand the perspective of the learner, and to diagnose any problems the learner is having with his perception of the encounter. Most importantly it requires the learner to assemble his own thoughts about what was learned during the encounter.

Example

“Tom, how do you think you did with your goal of positioning your left hand appropriately?”

“I think I did well this time. Just focusing on it seemed to help.”

“I agree. Your time to complete the case was very good, which was, in part, because of your efficiency with positioning.”

The learner should leave the encounter with some rule to guide future practice. Ideally, it is a rule the learner has formulated based on dialogue with the attending physician.

Example

“What will you remember to help you position your hand appropriately in the future?”

“Grab low enough on the fundus to expose the triangle, but at a place where I can move the fundus back and forth to dissect the liver bed.”

The attending physician should reinforce what was done right. The purpose for doing so is threefold. First, the reinforcement phase again calls attention to learning objectives of the encounter. This is important because learning to perform operations occurs in a practice milieu with many competing priorities. Second, learning to perform operations can be stressful and difficult, and providing reinforcement assists the learner in being able to maintain the effort necessary to persist. Third, and just as important, sometimes learners don't know that what they have done is

worthy of replication. Reinforcing what was done right makes explicit those actions the attending physician considers valuable and appropriate. Reinforcement can also emphasize the rule to guide future practice.

Example

“Focusing on positioning at the outset seemed to provide great exposure for dissection without disruptive changes of the grasper position.”

Correcting mistakes, especially mistakes in thinking, is a crucial part of the encounter. Although technical mistakes were likely corrected during the operation, it is important to assess and address the reasons for mistakes to guide future action. This phase takes advantage of the reflection phase. The focus is on what led up to the mistake and how that chain of events can be avoided in the future. When the mistakes may prove embarrassing to the learner, they should be addressed apart from other operating room personnel.

Example

“Make sure you consider the friability of the tissue. This gallbladder wasn't heavily inflamed so it could tolerate more torque during retraction. With friable tissue you may have to reposition more frequently to avoid tearing.”

The BID model with medical students

The previous examples focus on using the BID model with residents. But the model is flexible enough to support its use with less advanced learners, ie, with medical students on their surgery rotation. An example derived from observation is presented.

Briefing at the scrub sink begins with a needs assessment: “Shannon, what has been your experience with laparoscopic cholecystectomy? Have you ever scrubbed on one before?”

“No, this is my first.”

“OK. Because this is your first, I want you to focus specifically on how the pathology you observe logically leads to the symptoms the patient presented with.”

During the operation, the attending physician asked the student to discuss what would happen to this particular patient if he refused operation, what the student would do if this was her patient and showed up in the emergency room with right upper quadrant pain, and how to identify postoperatively the complication of a bile leak versus a collection of blood. All of this intraoperative teaching was focused specifically on the potential symptoms and sequelae of untreated pathology.

During the debriefing, the attending physician asked the student to reflect on what she had learned in the operation, to state a rule about differentiating biliary colic from acute

Table 1. Briefing, Intraoperative Teaching, Debriefing Model with Example

Step and timing	Subcomponents	Example: inguinal hernia repair
Briefing: 2 min	Identifying objectives for the operation: "What would you like to focus on today" or "I would like you to focus on . . ."	Attending to resident: "What would you like to focus on today?" Resident: "I would like to focus on improving my identification and dissection of the indirect sac."
Intra-operative teaching: brief, focused interactions during the operation (1-5 min each)	Teaching focused on identifying learning objectives, augmented with teaching scripts	Attending: "Where do you begin to look for an indirect sac?" Resident: "I usually begin somewhere in the middle between the deep and superficial inguinal ring." Attending: "It's important to begin exploration near the deep inguinal ring to avoid missing a very small indirect sac."
Debriefing: 1-3 min	Stimulate reflection on part of the learner	Attending: "How do you think you did?" Resident: "I felt better about the dissection of the sac. Using a more organized approach resulted in less bleeding by avoiding blunt dissection." Attending: "I agree. The dissection was careful and precise and you were able to reduce the sac without opening the sac."
	Teach general rules	Attending: "What will you take away from this case in regard to sac dissection?" Resident: "I need to remember to begin dissection more proximally to avoid missing a small sac."
	Reinforce what was right	Attending: "Your careful technique for dissection of the sac will avoid the complication of scrotal hematoma."
	Correct mistakes	Attending: "I would recommend moving the ilioinguinal nerve out of the dissection field early on to avoid possible injury during sac dissection."

or chronic cholecystitis, reinforced the student's understanding of anatomy, and corrected her approach to dealing with a postoperative complication in the emergency room.

Table 1 provides a second example of the BID model in use. Table 2 is a copy of the BID model, suitable for use as a 3 × 5 pocket card.

DISCUSSION

The BID model for teaching in surgery combines the best of several existing approaches to teaching in medicine. We refine them to make use of the educational advantages available to surgical educators and we narrow the focus to create a model that practicing surgeons can easily adopt in their daily practice. Our model incorporates elements of teaching that are demonstrated to improve learner performance. Beginning the encounter by agreeing on an objective creates a shared understanding of the educational purpose and focuses the learner's attention and performance,

which is an essential element of deliberate practice. The need to create an objective provides the learner with a stimulus to focus her use of the learning opportunity and provides the teaching surgeon an important opportunity to assess the needs of the learner. The learner's stated objective gives insight into the learner's depth of understanding and perception of her progress to date. It also gives the learner the opportunity to consider how the upcoming experience relates to previous experiences, activating existing knowledge and fostering the development of longterm memory.¹² The teaching surgeon's role is to create an environment in which the learners are expected to develop their own learning objectives. This means that the first few times the teaching surgeon uses this approach, she can expect the learners to develop nonspecific objectives. But with guidance, their objectives will become more usable.

Restricting the focus to a single objective also increases the likelihood that a permanent change in learner perfor-

Table 2. Briefing, Intraoperative Teaching, Debriefing Model Card

Stage	Step	Script
Briefing	Set learning objectives for encounter.	"What would you like to focus on?" OR "Today I want you to focus on . . ."
Intraoperative teaching	Teaching during the encounter	Focused on stated objectives
Debriefing	Reflection	"How do you think you did? Why?"
	Rules	"What did you learn for next time?"
	Reinforcement	"You did well at . . ."
	Correction	"Next time, do this . . ."

mance ability will occur. Doing so also focuses the attending surgeon's instruction during the operation. This, combined with structured debriefing and the opportunity for repeated practice, completes the essentials of deliberate practice.⁴ In addition, it allows the attending surgeon insight into how the learner understands her performance, which means the attending surgeon can refocus and reshape the learner's interpretation as necessary.

Surgeons who have used the model report that it is easy to fit into their existing practice. They could easily do the briefing at the scrub sink. Their teaching, although focused on the objectives set in the briefing, still incorporated their already existing teaching scripts.⁷ Much of the debriefing could be accomplished during the closing. They did note that more severe or embarrassing corrections should be done away from the rest of the operating room staff.

Learners experiencing the model reported that it was helpful to have a focus for the operation. This was true for both senior and junior residents. When queried, one senior resident was able to remember the specific teaching points he learned during an operation performed 2 weeks earlier. He commented that he wished this model of teaching were used in every operation, because he believed it helped him learn well.

These casual observations point to additional questions: Will busy surgeons use the BID model in their existing practice? Guided discovery learning and deliberate practice have been shown to lead to more efficient and effective performance improvement in a range of professions and for learners at all levels of expertise.¹³⁻¹⁵ Will focused intraoperative teaching lead to more efficient learning and performance improvement for residents? The learners we talked with thought the model supported more memorable teaching and fostered better learning. Will this be true of other learners working with other surgeons?

In conclusion, like the creators of the 1-Minute Preceptor, we sought to create a usable, educationally sound model for teaching that surgeons could easily incorporate into their daily practice. The time limitations imposed by duty hour restrictions make such a model more important than ever. Research on guided discovery learning convinced us that having a knowledgeable expert guide the learner was critical to efficient learning. Literature on deliberate practice further convinced us that the model had to have specific steps to guide the actions of both teacher and learner. Research on memory and learning convinced us that the learner must have an active role in shaping the learning encounter.

The BID model adopts the precepts of deliberate practice by focusing both teacher and learner on one objective, which guides intraoperative teaching. Intraoperative teaching consists of immediate feedback and guidance directed by specific learning objectives and the teacher's already existing teaching scripts. The debriefing element solidifies the learning that occurred in the operation through learner reflection. It guides future practice through reinforcement, correction, and generation of rules to guide future practice. Best of all, the model is usable within a teaching surgeon's already existing practice.

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