
Operating from the Other Side of the Table: Control Dynamics and the Surgeon Educator

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- BACKGROUND:** Critical moments in operations cause the surgeon to transition from a relatively “automatic” mode of operating to a more attentive mode—previously referred to as “slowing down when you should.” Using this framework, this study explored how academic surgeons manage and balance the often competing responsibilities of patient safety and education during the slowing-down moments.
- STUDY DESIGN:** This study used a constructivist approach to grounded theory methodology to explore an emergent theme of control among academic surgeons. Twenty-eight surgeons were interviewed across 4 academic teaching hospitals, and 5 general (hepato-pancreatico-biliary) surgeons were observed. Thematic analysis of the transcripts and field notes was conducted and iteratively elaborated and refined as data collection progressed with all team members. A reflexive approach was adopted throughout.
- RESULTS:** An interesting control dynamic emerged as surgeons discussed the need to maintain a sense of control of an operation regardless of how much manual control they had. A dual responsibility to education and patient safety was apparent, with surgeons describing and demonstrating numerous strategies for negotiating manual control with the trainee during the critical slowing-down moments. An assessment of the trainee was implicit in the negotiation process. Numerous complications of control were identified (“bargaining,” “skidding”) as a product of this control dynamic.
- CONCLUSIONS:** Operating from the “other side of the table” sets up a control dynamic that requires manipulation and negotiation on the part of the academic surgeon. Understanding these issues informs surgeons in their supervisory role, offering avenues for optimizing surgical training. (J Am Coll Surg 2010;210:79–86. © 2010 by the American College of Surgeons)
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As with many clinical settings, the operating room is a complex and dynamic environment. At times the procedure runs according to plan, requiring relatively little cognitive effort on the part of the surgeon beyond simply monitoring the progress of the procedure.^{1,2} Quite naturally and “automatically” surgeons in this setting will just do what they know how to do.^{3,4} At other times, the procedure requires more intensely effortful attention^{5,6} and

regardless of whether such a moment is anticipated before the operation (ie, is proactively planned) or whether it arises from an unanticipated emergent situation during the operation (ie, requiring situational responsiveness on the part of the surgeon), these moments are often experienced by the surgeon as a sense of slowing down (Moulton C, Regehr G, Lingard L, et al. Exploring the role of ‘slowing down when you should’ in surgical judgment. J Gastrointest Surg. In Press). It has been argued that the process of transitioning from the routine to the effortful, of “slowing down when you should,” is integral to the construct of expertise in the clinical setting.⁷ Recent research suggests that, at least in the surgical setting, this transition is experienced by the surgeon as a need to maintain control of the evolving operative environment (Moulton C, Regehr G, Lingard L, et al. Exploring the role of ‘slowing down when you should’ in surgical judgment. J Gastrointest Surg. In Press.)

The teaching context of the academic hospital setting magnifies this issue of control, as staff physicians must

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balance the need to maintain high standards of patient safety with the need to offer their trainees opportunities to gain experiences of progressively independent practice.⁸ Because of this additional complexity, the teaching context provides a unique opportunity to explore more elaborately this issue of how, when, and why physicians believe they must exert control of the clinical situation and the role of slowing down when you should in this process. In the context of a larger, multiphase study of intraoperative surgical judgment, during which we interviewed academic surgeons about their experiences of slowing down and observed this phenomenon in the operating room, the experience of control during the slowing-down transition emerged as a dominant theme. This article describes our explorations and elaborations of the control dynamic in the academic teaching environment within the framework of our model of slowing down when you should.

METHODS

This study was designed using grounded theory methodology, a qualitative methodology intended to explore a social phenomenon for the purposes of generating a descriptive or explanatory theory that is grounded in (ie, derived from) naturalistic data.⁹⁻¹¹ This 2-phase study took place during a 16-month period at 4 tertiary care academic teaching hospitals affiliated with a large urban university. Approval of Institutional Review Boards at the involved hospitals was obtained. Phase 1 included semistructured interviews (audiorecorded and transcribed) with 28 surgeons from various specialties (general surgery, $n = 9$; neurosurgery, $n = 4$; orthopaedics, $n = 3$; cardiac surgery, $n = 3$; vascular, $n = 3$; head and neck, $n = 2$; plastics, $n = 2$; thoracics, $n = 1$; trauma, $n = 1$) selected for their reputation as having excellent surgical judgment. Phase 2 involved observations of 5 hepato-pancreatico-biliary surgeons during a 10-month period (29 cases, 147 hours) to expand, confirm, and refine the preliminary framework developed from Phase 1. Surgeons in the observation phase were purposefully selected^{9,12} from the same specialty as the principal investigator (a hepato-pancreatico-biliary surgeon) to enhance the ability of the researcher to detect subtle nuances of the slowing-down phenomenon, adding to the credibility of the study. Interviews and observations were conducted by either the principal investigator (CAM) or a trained research assistant (CEM). The emergent theme of control in this teaching environment was explored in both phases of this study.

Discussions during and after operation were conducted with the operating surgeons to further explore the operative events. Thematic analysis of the transcripts in Phase 1 and field notes from Phase 2 was conducted by the principal

investigator and research assistant and results of the identified preliminary categories compared and discrepant categories discussed and brought to the research team when required. The larger research team, consisting of the principal investigator (CAM), research assistant (CEM), a cognitive psychologist (GR), a surgeon (HM), and a qualitative researcher (LL), met regularly to elaborate and refine the evolving framework as data collection progressed, contributing to the dependability of the results.⁹ In addition, a key informant (a hepato-pancreatico-biliary surgeon participant who became interested in the phenomenon and was able to be reflective about the emergent ideas and themes) provided opportunities for additional discussions and interviews that helped refine the various categories for this study. Data collection continued until additional interviews and observations ceased to inform the emergent thematic framework.¹³ Confirmability was ensured with the maintenance of an audit trail of all analytic memos, minutes of the meetings, and revisions to the coding structure. The final coding structure was applied to the complete dataset, using NVivo software (2007; QSR International Pty Ltd) to facilitate cross-referencing.¹⁴ A reflexive approach was adopted throughout the research process, a technique used by qualitative researchers to enhance their recognition of their own influence, eg, training, job, preconceived assumptions, on the research process—design, data collection, and analysis.^{15,16} Research rigor in this study was established according to the dimensions of “trustworthiness” in qualitative research.¹⁷⁻¹⁹

RESULTS

Although minor contextual differences between specialties were identified, broad thematic issues were representative of participants in both phases of the study, with the issue of control manifesting as a dominant theme in surgeon’s supervisory practices in relation to the slowing-down phenomenon; that is, surgeons regularly described how the teaching environment in surgery set up a control dynamic between surgeon and trainee. The management of this control dynamic was explored both preoperatively and intraoperatively. Several control dilemmas surrounding the slowing-down moments emerged throughout the study (Fig. 1; Table 1).

Control dynamic

Control issues were magnified when surgeons described their experiences of the slowing-down phenomenon in the supervisory setting. Because of the potentially critical nature inherent in the slowing-down moments, surgeons often experienced the need for increased levels of control. In the academic setting in which this study was conducted,

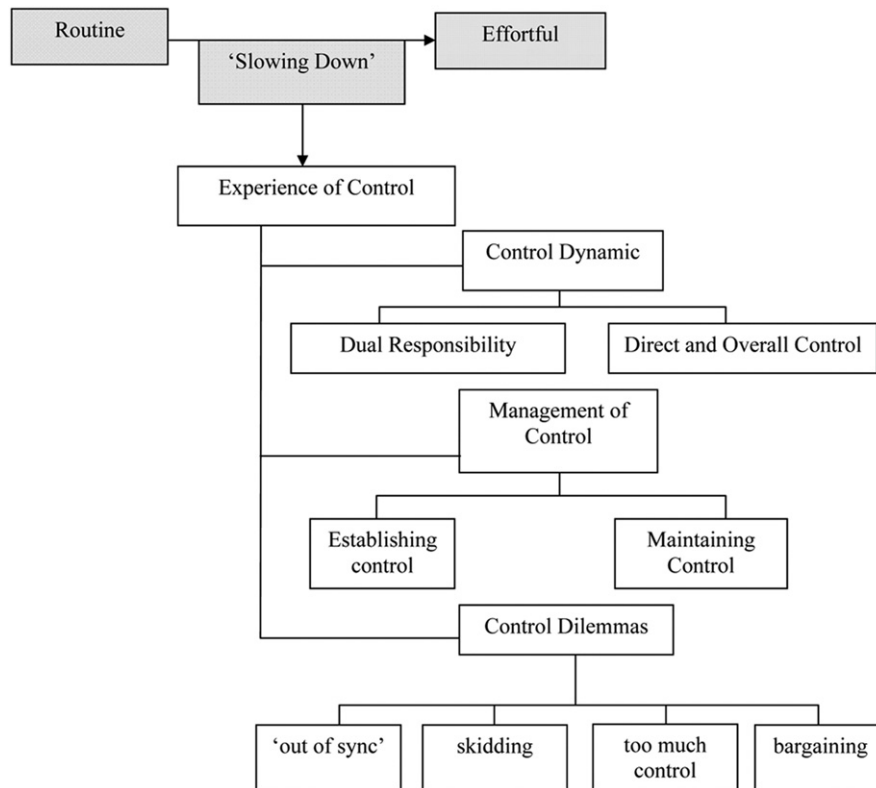


Figure 1. Conceptual framework.

the control issue seemed to be discussed at two different levels. The first level represents the amount of hands-on control the surgeon has at any particular time and is referred to here as *direct control*. Direct control includes the surgeon either taking over an operative case or manipulating the operative environment (eg, exposure) to influence the operative procedure. The second level of control represents the surgeon's sense of being in control of the case at any particular time, regardless of how much hands-on or direct control the surgeon has, and is referred to here as *overall control*. It was important for surgeons in this study to maintain their sense of overall control, and it was this sense of overall control that helped determine how much direct control they would give to trainees.

Surgeons believed that giving direct control to trainees was the best way for them to learn how to operate. As one surgeon said, "The best way to learn to operate is to actually operate." As a general rule, the desire to let trainees operate at the edge of their ability was a strongly held educational mandate among our participants. Although surgeons sensed this pressure to be hands off from an educational perspective, they acknowledged the need to maintain patient safety, causing them to alter their level of direct control as necessary to maintain overall control of the situation, particularly during the slowing-down or more critical

moments. As one surgeon stated, "... often I will take over... because I don't like the way it looks, I don't like the way it's going." The educational responsibility of letting trainees operate was not straightforward and was tempered not only by perceptions of patient safety but also by a perceived need to protect the trainees' sense of well-being or confidence in themselves as evolving surgeons. One surgeon noted:

"There is a certain level of operation that I will let a resident or fellow do but then there is a certain level of complexity to an operation I won't let the fellow do. And the reason is not because I don't necessarily feel that he or she can't do it but because if something happens I don't want them to have that on their conscience. I would rather, if something goes awry, that I'm the one who takes the blame, not them." (Interview 9, B01).

This position was echoed by many surgeons interviewed, highlighting the complexity of the decisions that surgeons make in the educational environment. The need for surgeons to maintain their sense of overall control during the slowing-down moments, while varying their own levels of direct control according to educational and

Table 1. Emergent Theme of Control

Themes and definitions	Representative transcript excerpts
Control dynamic	
Fluctuation of control that is negotiated by surgeons in the operating room as they manage the dual responsibility to education and patient care and negotiate control through the medium of a trainee.	
Dual responsibility to education and patient safety	
Balance the surgeon strives for between his supervisory role—interested in education—and his surgeon role—interested in patient safety.	“There is a sense of that need to let them exercise their own judgment and their own decision making, and that’s important. . . . I feel an obligation to allow them to do that, provided they’re not going to do anything harmful.” (Interview 3, A05)
Negotiate control through trainee	
Maintenance of control through the medium of a third person—the trainee—handing over and taking back direct control to achieve overall control.	“. . . a resident has control of the operation and, one way or the other, I’ll intervene to make sure I have control, not necessarily because I’m physically doing all the maneuvers but I can set the pace, I can control what everyone is looking at, and stuff like that.” (Interview 2, A03)
Management of control	
How surgeons negotiate control throughout the course of an operation—both general issues and specific strategies.	
General issues in establishing control	
General issues considered by surgeons when deciding the level of direct control necessary to achieve overall control.	“I need to know the fellow or resident is on the same page as I am. Otherwise I don’t trust him to start the case.” (Interview 8, KI01)
Specific strategies in maintenance of control	
Specific strategies surgeons have to negotiate direct control with the trainee to achieve overall control intraoperatively.	“I can set the operation up and control it so that the resident virtually cuts from A to B.” (Interview preoperation, B01)
Control dilemmas	
Challenges surgeons face as a result of the control dynamic	
Out of sync	
Instances where the trainee is not “slowing down” appropriately according to the surgeon—either the trainee is slowing down too much or too little.	“. . . there’s nothing worse than the trainees being ‘out of sync’ with your rhythm; they are either too slow and careful, not seeing the big picture, or too quick, not appreciating the details and nuances of the case.” (Interview 9, KI01)
Skidding	
Instances where a surgeon supervisor takes control too late.	“. . . by the time I opened my mouth to stay ‘stop’ it was too late. A second later there was a big hole in the cava. It’s almost like we skidded. From the time it got from my brain to my mouth and then from his brain to his hands it was too late.” (Interview 4, KI01)
Too much control	
Instances where a surgeon supervisor believes he retains too much control.	“I have to say I have a very short trigger to take over. . . . I know I have a pretty low threshold for giving into that feeling and not letting them [operate] . . . I am not sure it is helping them too much.” (Interview 4, A08)
Bargaining	
Instances where direct control is given to a trainee (reward) or taken away from a trainee (punishment) based on trainee investment and understanding of a case.	“She’ll go through the charts and if she has some questions, she’ll come and talk with me. And I find that very, very good, which is why, even though I’m not sure she’s up to doing the entire case, I’ll let her get started on them, because I can see she’s making an effort to be a good surgeon.” (Interview 3, A05) “I expect that they have analyzed the case before they get there. That’s my expectation . . . if they haven’t done that, they can just take off and they’re not doing the case at all, which I actually think is a very fair assessment.” (Interview 3, A05)

patient-safety priorities, made up the control dynamic that emerged from this study. The manipulation of direct control to achieve overall control was managed by the participants in several ways.

Management of control

An implicit negotiation process of giving up and taking back direct control to maintain overall control appeared to begin preoperatively and continue intraoperatively through establishing and maintaining appropriate levels of control.

Establishing control

Surgeons had general ideas preoperatively about how much direct control they would either retain or give away to a particular trainee. This included a general assessment of the trainee's knowledge and skill level, often assessed by previous experience with the trainee. As one surgeon said, "It would be highly unusual for me to leave a resident alone in the first week of his rotation with us." Surgeons considered the trainees' awareness of their limitations and how likely they would be to call for help based on past experiences and reputation: "I need to know that they know where to slow down, will be uncertain when they need to be, and will call for help when they need to." In addition, surgeons made assessments of how well trainees carry out instructions, essential for the surgeon to trust the trainee, especially when operating independently. As one surgeon said, "There are those (trainees) where, after the first few cases I know I can tell them what I would like to do and they'll do it. . . . And others, I basically have to watch them the entire time for the length of the rotation, to make sure they don't exercise their own free will too much." Having confidence in the trainee enabled the surgeon to relinquish a greater degree of direct control and still believe he had overall control of the operative case. Finally, surgeons considered the preparedness of the trainee for that particular case. Surgeons were confident in the trainee who had invested in the case, had considered the critical moments of the case, and had a similar "game plan" to the surgeon's own. As one surgeon said, "I need to know the fellow or resident is on the same page as I am. Otherwise I don't trust him or her to start the case." This process of establishing a level of direct control between surgeon and trainee determined how hands on the surgeon intended to be.

Maintaining control

Fluctuating levels of direct control to maintain overall control was also described as a process that occurred intraoperatively, often triggered by the surgeons' own intraoperative slowing-down moments. When the procedure was at a delicate stage or when an unexpected situation arose, surgeons described the desire to exert additional control of the

situation. In addition to their own slowing-down moments, supervising surgeons had to monitor the trainees' slowing-down moments, keeping them on track and ensuring they slowed down when they should. This recognized need to slow down, not only according to the surgeon's own cues but also in response to what the trainee was doing, required an elaborate monitoring process and a constantly fluctuating level of involvement with the case: ". . . usually I just let them operate. I assist them, but there are times when I can see they are going off track. I need to take over operating sometimes to get them back on track and then give it back to them."

There were various strategies surgeons used to maintain overall control intraoperatively that required fluctuating their level of direct control during the case. One particular strategy described to negotiate additional direct control was to manipulate the exposure of the operative field, altering what is presented to the trainee. One surgeon described, ". . . a resident has control of the operation and, one way or the other, I'll intervene to make sure I have control, not necessarily because I'm physically doing all the maneuvers but I can set the pace, I can control what everyone is looking at, and stuff like that." Surgeons acknowledged the ability to give trainees the illusion of having control, as they maintain almost complete direct control from the other side of the table. As one surgeon described, "I can set the operation up and control it so that the resident virtually cuts from A to B."

Although giving the trainee the illusion of having control can have benefits from an educational perspective (providing self-efficacy for the junior trainee and providing an opportunity to keep trainees operating with time constraints), some surgeons warned that it might give undue confidence to the trainee. One surgeon stated:

"I think most of them in their own mind they think they're sort of doing this big operation even though we're leading them point to point and they sometimes get to a point where they think they can just go do the whole thing and they're not really listening to the plan, they're not doing what you want them to. They think they can do it." (Interview 5, A09)

Surgeons believed that residents who were given the illusion of control were prone to underestimate the actual contribution from the staff surgeon. Without appreciating the intricate details (eg, exposure techniques, forward planning) necessary to perform the procedure safely, surgeons feared it could make trainees overconfident, giving them a false sense of "competence."

This often implicit intraoperative negotiation of giving and taking away some degree of direct control appeared to

be a fairly fluid process throughout the procedure, according to what was occurring in the operative field and how competent the surgeon judged the trainee to be in dealing with the particular task. More critical moments that threatened their sense of overall control required more direct control and more hands-on intervention, and this increased level of direct control was achieved in various ways.

There were some surgeons who described giving up direct control to the trainee completely by leaving the room for short periods of time. Although surgeons acknowledged they gave up complete direct control in these situations, they were reluctant to say they lost their sense of overall control. They maintained their overall control during these situations by making an assessment (or as some termed it, *a calculated risk*) that they were handing over a controlled situation and the risk to patient safety was minimal. As one surgeon stated, “There are going to be moments of surgery where it’s routine, where the risk is low, those are areas of the surgery that a resident or fellow is doing it himself . . . and that’s part of the expertise, to recognize those areas when the delicate aspects of surgery [are].”

Control dilemmas

When discussing their experiences with slowing-down moments within the teaching context, surgeons described instances when this control dynamic became especially challenging.

Out of sync

When things were going well between the surgeon and trainee, surgeons described a flow that occurred from being “in sync” with the trainee. As one surgeon described, “It’s a pleasure to operate with trainees when you both are on the same page. You think about the case in the same way and anticipate the same issues.” When surgeons and trainees slow down at the same moment, a synchronicity is experienced by the surgeon that is both pleasing and helpful. Alternatively, surgeons describe trainees who, in their opinion, slow down too much, “substituting meticulousness for knowledge or experience.” Here surgeons believed the need to speed up the trainee, giving him confidence with statements such as, “There is nothing you can do here that I can’t get you out of.” On the other hand, surgeons describe trainees who appear to “plough through” everything; “I think there’s a lot of protection for trainees and I think that’s why a lot of them just don’t really slow down until you force them to.”

Skidding

Another complication of the control dynamic was described when surgeons found themselves at the edge of control—taking over too late. Surgeons described a “skid-

ding” phenomenon in which they believed they took control of an evolving issue too late, failing to slow down or stop the trainee in a timely fashion (Table 1). Skidding was illustrated in a reflective note from the observational sessions:

During a liver resection, the surgeon operating from the other side of the table, shouted to the fellow who had direct control of the procedure, “Stop. Stay. Still.” When questioned about this following the operation, he said, “They don’t always stop when you want them to, or when you feel they need to. You have to be forceful sometimes if you feel they aren’t listening.” (Field notes, Surgeon OR02)

The potential the trainee had for putting the patient at risk, because of his direct control of the case, seemed to threaten the surgeon’s sense of having overall control.

Too much control

Not all surgeons resonated with the skidding phenomenon, stating their experience was often the opposite. As one surgeon described, “I have to say I have a very short trigger to take over. . . . I know I have a pretty low threshold for giving into that feeling and not letting them [operate]. . . . I am not sure it is helping them too much.” These surgeons felt they supervised with a different style, never giving enough direct control to the trainee to ever do harm, appearing apologetic for its possible negative effects on education.

Bargaining

A third complication of the “control dynamic” involved the bargaining arrangement that gets established between surgeon and trainee. If trainees prepared for a case, surgeons more willingly invested in the trainee; if trainees did not prepare for a procedure, surgeons were less willing to invest in them (Table 1). Although some described a reward for what they perceived as “good behavior,” many described the opposite, with a punitive system for “bad behavior,” a situation they perceived as much more common. This bargaining arrangement appeared, for many surgeons, to be implicitly carried out without active communication with the trainee and seemed to flow in the reverse direction, from trainee to surgeon also, according to one surgeon who stated:

“There’s an expectation, especially for senior trainees, that they’re doing operations and we have to appropriately utilize them because there’s a balance. . . . Once they’re no longer doing it, you need them there as an effective assistant, and you certainly don’t want them to sabotage the operation. You do

get the occasional person who disengages when he's no longer in charge and that's problematic too" (Interview 2, A04).

DISCUSSION

The control dynamic investigated in this study describes the surgeon's struggle with balancing the dual responsibility of education and patient care through the medium of the trainee. These two mandates might appear as opposing responsibilities, particularly during the critical slowing-down moments. Surgical training relies on a model of progressive independence, where supervision of trainees is progressively withdrawn as their skill level increases. This model has its roots in the Halstedian apprenticeship style of teaching medicine, where trainees spend many years under direct supervision of a teacher, learning the skills, knowledge, and art of medicine.²⁰ Gradually, if the training works, supervision is withdrawn until trainees are autonomous and independent operators. Certainly, surgeons in this study considered supervision an important aspect of training for the purposes of developing particular skills thought necessary to function independently. In other studies, medical trainees also perceived this progressive independence to be necessary for learning to take responsibility and "stand on your own feet."²¹ In the expertise literature, Bereiter and Scardamalia⁶ define an expert as one who chooses to work at the upper echelons of his profession—progressively advancing his field by working at the highest limits of complexity. Expertise, in this way, defines an approach to practice that should be learned and adopted early in a career. Surgical trainees, in this model, would be given the opportunity to stand on their own feet and work at the upper limits of their competence without the overprotection of a supervisor. This would provide opportunity for them to develop into true experts.

But, as identified by surgeons in this study, a particular challenge arises when allowing trainees to become independent in the clinical arena because of the need to maintain patient safety from the "other side of the table." Kennedy referred to this challenge in a medical pediatric practice as a *double bind*, where two competing priorities (education and patient safety) were difficult to attend to at all times, resulting in one taking temporary priority over the other.²² The continuous negotiation of control in this study could be perceived as a means of managing this double bind,²³ handing over as much control to the trainee as possible but taking it back in various forms when necessary, all the while maintaining an overall sense of control. This requires an assessment and constant monitoring of the situation and trainee, with control for the surgeon appearing along a spectrum

of supervisory activities from hands off on one hand to taking over on the other, with many subtle and not so subtle strategies in between.

Participants in Kennedy's study made point-of-care assessments of trainees' competence to provide independent patient care, moving beyond simple assessments of knowledge and skill to a multidimensional construct of trustworthiness.²⁴ This construct appears to be consistent with how surgeons made assessments of surgical trainees' abilities to operate independently, with knowledge and skill level, discernment (referring to trainees' awareness of limits of skill and when to call for help), and conscientiousness (referring to trainees' dependability in following through assigned tasks) featuring prominently in their appraisals. Surgeons in this study made additional assessment of how prepared the trainee was for each particular case. As with previous work, surgeons believed that preoperative preparation, with the creation of a "game plan" and consideration of proactively planned slowing-down moments, was a crucial aspect of their own construct of intraoperative judgment (Moulton C, Regehr G, Lingard L, et al. Exploring the role of 'slowing down when you should' in surgical judgment. *J Gastrointest Surg.* In Press.), applying the same metric for assessments of trainees in this study. In order for them to be comfortable handing over control to the trainee, the trainee's game plan and proactively planned slowing-down moments needed to be consistent or in sync with theirs. In the context of the slowing-down framework then (Moulton C, Regehr G, Lingard L, et al. Exploring the role of 'slowing down when you should' in surgical judgment. *J Gastrointest Surg.* In Press.), surgeons appear more likely to hand over control when trainees have the same game plan, have considered the same proactively planned slowing-down moments, can be trusted to recognize the intraoperative cues requiring a situationally responsive slowing-down moment, and can be trusted to call for help when necessary.

When the challenging aspects of surgical supervision are appreciated alongside an awareness of how surgeons make assessments of trainees, we can begin to construct a framework that highlights more explicitly our expectations of trainees. At the same time, an understanding of the strategies surgeons use in negotiating control, alongside an awareness of the "illusion of control," can provide surgeons with tools to be more explicit in their efforts to authentically hand over control when appropriate. This will provide trainees with opportunities to develop their own situation awareness—to perceive for themselves the important cues in their operative field, to construct a meaning for what these cues represent, and to project how these cues will impact the future state in

relation to their operational goals.²⁵ Until trainees learn to develop their own situation awareness, they are unlikely to appropriately slow down when they should. An understanding of the dynamics of surgical supervision will assist us in our efforts of training independent, true expert⁶ surgeons while simultaneously providing expert clinical care, fulfilling our dual responsibility of education and patient safety.

Author contributions

Study conception and design: Moulton, Regehr, Lingard, MacRae

Acquisition of data: Moulton, Merritt

Analysis and interpretation of data: Moulton, Regehr, Lingard, Merritt, MacRae

Drafting of manuscript: Moulton, Regehr

Critical revision: Moulton, Regehr, Lingard, Merritt, MacRae

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