

Disparity Between Resident and Attending Physician Perceptions of Intraoperative Supervision and Education

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Abstract

Background As part of an ongoing evaluation of our residency program, a needs assessment was performed to assess resident and attending perspectives on current methods of surgical skills training in the operating room.

Methods Participants included obstetrics-gynecology residents and faculty at a university program. Two surveys were developed and validated. Results were analyzed with 2-sample *t* tests, comparing Likert scores. Findings were significant if the difference between means was >1 .

Results Thirty of 31 residents and 40 of 60 attending physicians responded to the survey. Residents and attending physicians agreed that the surgical skills training program needs improvement (difference in mean, -0.39 ; confidence interval [CI]: -0.98 to 0.20). The areas of most disagreement were regarding feedback on

surgical skills and instrument handling (difference in mean, 2.53 ; CI: 1.81 – 3.26 , and difference in mean, 2.24 ; CI: 1.44 – 3.05).

Conclusions A significant proportion of surgical skills training during residency occurs as on-the-job training, and operating room time provides a key learning opportunity. This report demonstrates that there is a noteworthy difference in the perception of attending physicians and residents about the quality of teaching and feedback that is currently occurring in the operating room. The difference in perspectives among residents and attending physicians reported in this survey suggests a need for improved communication and systematic feedback in order to capitalize on operating room time as a critical surgical skills training arena.

Background

The earliest training models for surgical skills training were built on an apprenticeship model. In 1928, delegates of the American Medical Association formally endorsed residency training in accordance with this model.¹ The concept of residency training came from the German training system and supported teaching surgical skills through observation of an expert in the field, with progression to performance of a specific procedure based on the decision of that expert.¹ In the 1990s there was a shift in thinking about optimal approaches to surgical skills training. The introduction of laparoscopy presented a new set of surgical skills that required mastery by both trainees and expert surgeons. As a result, the term *expert* was called into question, and the best means of training was reevaluated. Whereas expertise had previously been based on

professional experience and the opinion of one's peers, there became a new concern for superior performance and reproducibility.² The Calman Report reiterated these concerns on a national level in 1993, stressing the need for standardization of teaching surgical skills.¹

In the evolution of surgical skills training, many different models for skill acquisition have been used to determine the best means of teaching surgical skills. Dreyfus and Dreyfus described stages of skill acquisition, including novice, advanced beginner, competent, proficient, expert, and master.³ This model focuses on the importance of pattern recognition, intuition, and reflection as key elements of skill acquisition.³ Peyton described a 4-stage approach to teaching manual skills. It includes instructor demonstration; instructor deconstruction with breakdown into simple steps; formulation, with the instructor demonstrating the skill as the student recites the steps; and ultimately, performance by the student.¹ Perhaps the most widely accepted model for surgical skills training is drawn from studies of teaching pilots, musicians, and athletes through the use of a 3-step model. The first step is the conscious phase, in which each step is thought out. The second step is the shared control phase, in which simple tasks are performed without much thought, while complex tasks still require a step-by-step approach. Finally, in the automatic phase, complex procedures are performed easily.⁴ These models place importance on repetition of a specific skill critical for both

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Likert Scale	Definition
1	Strongly Disagree
2	
3	Disagree
4	
5	Neutral
6	
7	Agree
8	
9	Strongly Agree

FIGURE 1

Likert Scale With Definitions, Used by Physicians To Express Their Degree of Agreement

retention and improved performance.¹ Ericsson² labeled “deliberate practice” as one critical element to achieving expertise, along with other important factors such as having a well-defined goal, motivation to improve, feedback, and gradual refinement.

In contemporary medical education, the effort to build on these models has led toward an emphasis on teaching surgical skills outside the operating room. Simulation techniques and surgical skill trainers have proven to be a worthwhile and appropriate practice tool, and use of such training models in resident education has grown.⁵ The importance of teaching outside the operating room is reinforced by the continuing development of new surgical technologies including robotics, focus on reduction of medical errors, and resident work hour restrictions.⁶

New teaching tools developed for outside the operating room may complement and improve surgical skills training. Nevertheless, the operating room remains the true forum of performance for a surgeon and is still of primary value as a teaching environment for the resident surgeon.⁷ It is in the operating room where a surgeon combines decision making with the technical aspects of surgery⁵; therefore, the goal for superior surgical skills training can only be achieved through teaching improvements both inside and outside the operating room, creating a balance of practice and performance.

We are concerned that the emphasis on training outside the operating room may inadvertently lead to de-emphasis on the importance of intraoperative teaching. In the effort to improve surgical skills training overall, opportunities and techniques to improve teaching within the operating room must also be emphasized, including the development of feedback techniques and learning tools specifically for the operating room. We speculated that the perception of the quantity and quality of intraoperative teaching varied between residents and faculty. Specifically, we wondered whether a disparity exists between faculty and residents regarding perception of preparation for surgery, intraoperative teaching, and feedback. In this context, a needs assessment survey was performed among obstetrics-gynecology residents and attending physicians, with the ultimate goal of using the results to improve surgical skills training in the operating room.

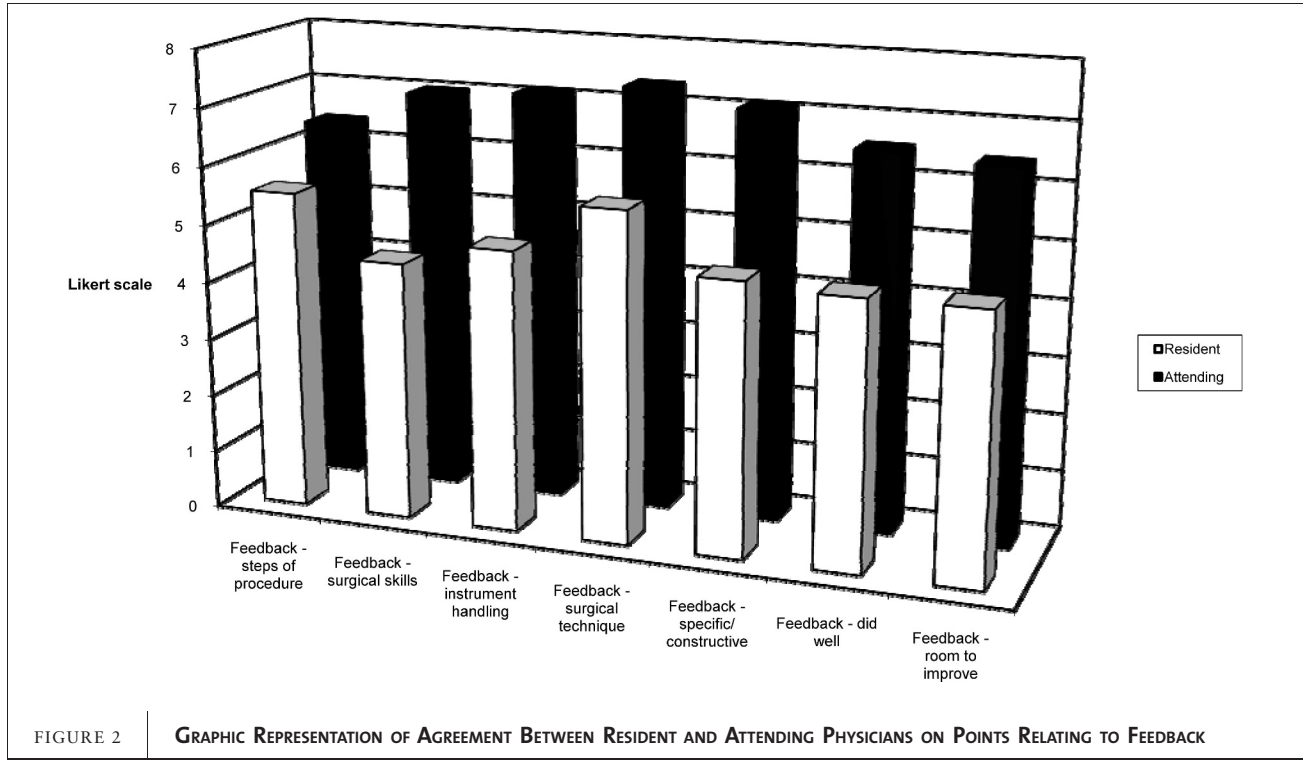


TABLE 1 RESIDENT AND ATTENDING PHYSICIAN AGREEMENT WITH A DIFFERENCE IN MEANS $\leq 1^a$

Attending Physician, Mean (95% CI)	Resident, Mean (95% CI)	Difference in Means (95% CI)
I feel that the (institution's) surgical skills training needs improvement.	I feel that the Johns Hopkins GYN/OB surgical skills training needs improvement.	
6.98 (6.54–7.41)	7.37 (6.96–7.78)	–0.39
Agree	Agree	(–0.98 to 0.20)
Before starting an operative case, I discuss the planned procedure with the resident.	Before starting an operative case, I discuss the planned procedure with the senior resident or the attending physician.	
6.58 (6.13–7.02)	5.83 (5.30–6.37)	0.74
Agree	Agree	(0.06–1.43)
During a procedure, I give feedback specific to each step of the procedure.	During a procedure, I get feedback regarding different steps of the procedure.	
6.38 (5.81–6.95)	5.53 (5.02–6.05)	0.85
Agree	Neutral/agree	(0.10–1.61)
During a procedure, I ask pertinent questions regarding the case.	During a procedure, I am asked pertinent questions regarding the case.	
6.33 (5.85–6.80)	5.41 (4.85–5.98)	0.91
Agree	Neutral/agree	(0.19–1.63)
It is evident that most residents review anatomy prior to a procedure.	Before starting an operative case, I review anatomy on my own.	
4.88 (4.41–5.34)	6.43 (6.04–6.82)	–1.56
Disagree/ neutral	Agree	(–2.15– –0.96)
During a procedure, I make a point of demonstrating anatomy.	During a procedure, the attending physician makes a point of demonstrating anatomy.	
6.87 (6.48–7.26)	5.17 (4.57–5.76)	1.71
Agree	Neutral/agree	(1.00–2.41)

Abbreviation: CI, confidence interval.

^a Mean responses to these questions were similar among residents and attending physicians. The difference in means was noted to be ≤ 1 . Statistical analyses were performed using 2-sample *t* tests.

Methods

This study was performed as a quality improvement effort as a part of the Accreditation Council for Graduate Medical Education program requirements. Thirty-two obstetrics-gynecology residents (postgraduate years 1–4) and 60 attending surgical obstetrics-gynecology faculty members were identified as participants in a residency training program of 1 academic institution. Two different surveys were created using the 9-step process suggested by Stone⁸ to create a useful and valid questionnaire. One survey was designed to elicit the opinions of attending physicians and the other to determine the opinions of residents regarding surgical skills training. Specific questions focused on resident preparation prior to a surgical case, attending physician teaching in the operating room, and feedback from attending physicians. The questions of each survey were structured to ask similar questions from either

attending physician's or resident's perspective so they could be compared. Responses were obtained using a Likert scale from 1 to 9 (FIGURE 1).

The surveys were distributed to residents and faculty using an online survey website service (SurveyMonkey, Menlo Park, CA). The surveys were sent out via e-mail with a short explanation that the survey would be anonymous, and that it would be used in an effort to improve surgical skills training at the institution (FIGURE 2).

Results were analyzed with a 2-sample *t* test, comparing mean score for attending physicians versus residents. The hypothesis for the *t* test was that the difference in means was >1 . This hypothesis was chosen because of the definition of the categories for the 9-point Likert scale. A difference in response between attending physician and resident of >1 , with a 95% confidence interval that did not cross 1, was therefore considered significant.

TABLE 2 ATTENDING PHYSICIAN AND RESIDENT DISAGREEMENT WITH A DIFFERENCE IN MEANS >1^a

Attending Physician, Mean (95% CI)	Resident, Mean (95% CI)	Difference in Means (95% CI)
I give frequent feedback to residents regarding their surgical skills.	I receive frequent feedback from attending physicians regarding my surgical skills.	
7.00 (6.57–7.43)	4.47 (3.87–5.06)	2.53
Agree	Disagree	(1.81–3.26)
The feedback that I give during and after a case is constructive and specific.	The feedback that I get from attending physicians during and after a case is constructive and specific.	
7.08 (6.77–7.39)	4.70 (4.21–5.19)	2.38
Agree	Disagree/neutral	(1.81–2.95)
During a procedure, I give feedback regarding instrument handling.	During a procedure, I get feedback regarding instrument handling.	
7.11 (6.62–7.59)	4.86 (4.20–5.53)	2.24
Agree	Disagree/neutral	(1.44–3.05)
After completing a case, I give formative feedback to the residents regarding what they did well.	After completing a case, attending physicians give formative feedback regarding what I did well.	
6.53 (6.08–6.98)	4.60 (4.08–5.12)	1.93
Agree	Disagree/neutral	(1.25–2.60)
After completing a case, I give formative feedback to the residents regarding what they could improve on.	After completing a case, attending physicians give formative feedback regarding what I could improve on.	
6.42 (5.94–6.90)	4.60 (4.08–5.11)	1.82
Agree	Disagree/neutral	(1.13–2.51)

Abbreviation: CI, confidence interval.

^a The mean response of residents was on one side of neutral while the mean response of attending physicians was on the other side of neutral. The difference in mean Likert scores were >1. Statistical analyses were performed using 2-sample *t* tests.

Results

Thirty-one of 32 residents responded to the survey (97% response rate) and 40 of 60 attending physicians responded (67% response rate).

There were several areas in which residents and attending physician agreed. Both groups proposed that the surgical skills program needs improvement, with an average attending physician score of 6.98 (defined as “agree”) and an average resident score of 7.37. Attending physicians and residents agreed that, in general, they discussed the planned procedure prior to the case (mean score of 6.58 vs 5.83; mean difference, 0.74; confidence interval [CI]: 0.06–1.43) and that attending physicians ask pertinent questions regarding the case (mean difference, 0.91; CI: 0.19–1.63). Finally, attending physicians and residents agreed that attending physicians give feedback specific to each step of the procedure (mean difference, 0.85; CI: 0.10–1.61).

There were 2 questions for which a trend toward disagreement was noted, with the difference in Likert score

not reaching statistical significance. These questions were specific to anatomy, and the first question addressed residents’ review of anatomy prior to a case (4.88 vs 6.43; mean difference, 1.56; CI: –2.15 to –0.96). Similarly, the trend showed that attending physicians are more likely to agree that they demonstrate anatomy (6.87 vs 5.17; mean difference 1.71; CI: 1.00–2.41) (TABLE 1).

There was a disparity in perception of feedback in the operating room. Although attending physicians agreed (7.00) that they that they give frequent feedback regarding surgical skills, residents disagreed (4.47). Similarly, attending physicians agreed that they give specific and constructive feedback during a case (7.08), feedback regarding instrument handling (7.11), formative feedback on what residents did well (6.53), and opportunities for improvement (6.42). Residents, on the other hand, were more likely to disagree with these statements, with mean scores ranging from 4.60 to 4.86. The difference in means between residents and attending physicians for these

TABLE 3 RESIDENT AND ATTENDING PHYSICIAN AGREEMENT WITH DIFFERENCE IN MEANS $>1^a$

Attending Physician, Mean (95% CI)	Resident, Mean (95% CI)	Difference in Means (95% CI)
During a procedure, I give feedback regarding proper surgical technique.	During a procedure, I get feedback regarding proper surgical technique.	
7.34 (6.97–7.69)	5.70 (5.22–6.18)	1.63
Agree	Agree	(1.04–2.22)

Abbreviation: CI, confidence interval.

^a Responses for both residents and attending physicians were on the same side of the Likert scale (>5 or <5); however, the difference in mean Likert scores was still >1 . Statistical analyses were performed using 2-sample *t* tests.

questions all reach statistical significance, ranging from 1.82 to 2.53, with confidence intervals that are >1 and do not cross 1 (TABLE 2).

Both residents and attending physicians agreed that there is feedback on proper surgical technique (mean *t* scores of 7.34 and 5.70, respectively), but the difference in means for this question, 1.63, did reach statistical significance (TABLE 3). Finally, although attending physicians were more likely to disagree that most residents review how procedures are done prior to a case (mean score, 4.80), residents were more likely to agree (mean score, 6.90). This difference was statistically significant, with a difference in means of -2.10 (CI: -2.72 to -1.48 , TABLE 4).

Discussion

As new teaching tools are developed, it is critical to remember the fundamental value of the operating room as a learning environment for surgeons. In order to create a balanced surgical skills training program, residency programs must continue to strive to improve the communication and feedback between residents and attending physicians in the operating room. This type of one-on-one focused learning in a setting in which both

technical skill and judgment are evaluated is crucial to the development of expert surgeons.

Teaching in the operating room must be examined with the same critical eye applied to surgical skills training outside the operating room, and new techniques and models of learning must be incorporated in this setting as well. The survey presented here was therefore undertaken to improve surgical training in the operating room. The goal was to examine areas in which residents' and attending physicians' perceptions of teaching differed. This information can then be used to determine new tools and teaching techniques to improve the learning environment of the operating room.

The findings in this investigation suggest that even though residents and attending physicians agree that productive learning currently occurs in the operating room, there is room for improvement. The areas in which attending physicians and residents disagreed the most were specific to feedback in the operating room. As this is a critical element in adult learning,⁹ this survey exemplifies the need for tools to improve communication and to better align the perceptions among residents and attending physicians with regards to feedback in the operating room.

TABLE 4 ATTENDING PHYSICIANS AND RESIDENTS DISAGREE WITH DIFFERENCE IN MEANS $>1^a$

Attending Physician, Mean (95% CI)	Resident, Mean (95% CI)	Difference in Means (95% CI)
In general, I make the extra effort to act as a teacher in the operating room.	In general, attending physicians make the extra effort to act as teachers in the operating room.	
7.70 (7.32–8.08)	5.77 (5.32–6.23)	1.93
Strongly agree	Agree	(1.35–2.50)
It is evident that most residents review how procedures are done prior to an operative case (either from a text or a web-based resource).	Before starting an operative case, I review the procedure on my own (for example, using a text or a web-based resource).	
4.80 (4.29–5.31)	6.90 (6.53–7.27)	-2.10
Disagree/neutral	Agree	(-2.72 to -1.48)

Abbreviation: CI, confidence interval.

^a Mean difference in Likert score >1 . Statistical analyses were performed using 2-sample *t* tests.

This survey is limited by the small number of participants; however, the survey is specific to one particular hospital, and the response rate (particularly from residents) was very high, giving a comprehensive view of practices and perceptions in this department. It is not clear whether the responses obtained may be extrapolated to other programs or are unique to our own program. Furthermore, this survey asks for a general opinion from both residents and attending physicians and does not account for the fact that some attending physicians may be very good at giving feedback and some attending physicians may not be as skilled in this area. Therefore, more specific data may be important when structuring how to improve communication and provide improved feedback on surgical skills. Importantly, procedure-based specialty residency programs may benefit from similar self-evaluations as demonstrated in this report.

Conclusions

Our survey revealed specific areas with room for improvement in teaching in the operating room. The goal of this study was to produce information that could be used in a productive way to improve surgical skills training in the operating room. By recognizing the differences in

perceptions between residents and attending physicians, specific education tools and guidelines may be developed in order to bridge the communication gap and increase the feedback to residents in the operating room. By achieving this type of intervention, the program can help to expedite the transition of resident physicians to becoming expert surgeons and to improve the teaching skills of attending physicians.

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