



Residents' method for gaining operative autonomy

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ARTICLE INFO

Article history:

Received 5 December 2019

Received in revised form

10 March 2020

Accepted 19 March 2020

Keywords:

Autonomy

Surgical residency

Entrustability

ABSTRACT

Introduction: The goal of this study was to explore the resident construct for their perceived successful method of actions that lead to OR autonomy during residency and the strategies they employed.

Methods: We conducted focus group interviews with residents from the General Surgery (GS) and Obstetrics & Gynecology (OBGYN) departments at a single academic institution across all clinical post-graduate years (PGY) using convenience sampling. Audio recordings of each interview were transcribed, analyzed and emergent themes were identified using a framework method.

Results: A total of 38 residents participated. A 3-stage resident method to gain operative autonomy emerged. This progresses from building rapport, developing mutual entrustment, and finally to obtaining autonomy. We identified 4 common strategies used by residents to construct this method: smart communication, attention to attending preferences, helpful allies and visible attributes.

Conclusion: Our findings provide insight into resident strategies to achieve progressive autonomy in the OR helping programs improve resident's learning efficiency.

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Introduction

The purpose of a residency in general surgery is to develop and supply independent surgeons capable of safely caring for the surgical patient. These programs have the complex task of transforming inexperienced medical students into independent surgeons. This process has historically been accomplished with long hours in the hospital, memorization of surgical textbooks and gradual attainment of clinical and operative autonomy under close mentorship from senior residents and faculty. Today the climate of surgical education is changing. The ACGME limit the time spent in the hospital to 80 h per week. (ACGME Common Program Requirements, Section IV-F.1, 2017). New studies regarding the best methods for adult learning have challenged the previously simple directives toward memorization of surgical tomes in favor of simulation or case based studies.^{1,2} Additionally, enhanced faculty supervision is increasingly expected by patients despite limited evidence that resident involvement is a detriment to patient safety outcomes.^{3,4} These trends have hampered the development of mutual entrustment between residents and faculty and may stunt

residents' readiness for independent practice.

Especially in surgical residency training, operative autonomy is a critical component contributing to resident learning in the operating room (OR) and to the development of surgical competencies. Resident autonomy in the OR is a two-way street and gaps commonly exist between perceptions and expectations of autonomy among attending surgeons and residents. A recent study indicated that autonomy reported by the attending surgeon and the resident were both significantly lower than the "expected autonomy".⁵ Additional studies by Meyerson demonstrate that there is a gap between expected performance and autonomy as defined by senior residents and faculty and actual autonomy achieved by the residents during the case.⁶

Numerous studies have been conducted to explore evidence and approaches used by attending surgeons to determine resident OR autonomy. Teman et al. found that attending surgeons grant autonomy based on observed clinical skill and the attending's own comfort with the operation.⁷ Chen et al. reported attending surgeons tended to use verbal and/or physical approaches to examine resident real-time entrustability prior to granting resident autonomy in the OR.^{8,9} Torbeck et al. suggested residents' increased OR preparedness would promote autonomy.¹⁰ These studies enriched the understanding of autonomy from the faculty perspective. To generate effective interventions to improve surgery resident

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learning and autonomy in the OR and to balance faculty supervision and resident autonomy, it is imperative to identify the residents' approaches to gaining autonomy as well. The goal of this study was to explore the resident construct for their perceived successful method of actions that leads to operative autonomy during residency. We also explored self-reported strategies that may lead to enhanced OR autonomy and entrustment during residency.

Methods

Study design and participants

A focus group interview approach was selected as little knowledge exists regarding residents' self-directed approaches to achieving operative autonomy. Between January and May of 2018 we recruited focus groups participants from a General Surgery (GS) residency program (6 categorical resident per training year) and an Obstetrics and Gynecology (OBGYN) residency program (11 categorical resident per training year) at The Ohio State University. OBGYN residents were included due to the strong foundation in procedural and operative tasks inherent to their specialty. Including OBGYN residents also helped to increase the transferability of the results, which is the extent to which the findings can be transferred or applied in different settings. All residents from both departments were eligible to participate and recruited via institutional email. To reduce selection bias we enhanced the credibility of the study by collecting data from different subgroups of participants (e.g. junior and senior, male vs. female, GS and OBGYN) through a convenience sampling approach. In total, 16 junior (PGY 1–2; 8 GS [50% response rate], 8 OBGYN [36% response rate]) and 22 senior (10 GS [55.5% response rate], 12 OBGYN [54.5% response rate]) residents participated in the focus group interviews through convenience sampling. The Ohio State University Institutional Review Board approved this study.

Data collection and analysis

Resident focus groups, divided according to postgraduate year (PGY) year and specialty, were conducted to allow participants to share their experiences with peers in a comfortable environment. A resident or a clinical fellow investigator facilitated each focus group. The trainee-investigators (IW and BQS) who facilitated focus group interviews with the principle investigator (XPC), did not participate in any focus groups as study participants. A semi-structured interview guide was developed using a combination of our previous studies of expert surgical teachers, the goals of the study and the literature.¹¹

Each focus group duration was approximately 60 min. The facilitator restated or summarized information and then asked the participants for feedback on accuracy during the interviews. All interviews were audio-recorded, transcribed, de-identified and analyzed using a Framework Method, which provides a systematic, rigorous approach for content analysis that incorporates both inductive and deductive approaches to analysis.¹² We focused our analysis on one key interview question "How have you successfully gained increased autonomy in the OR?" Three investigators (BQS, IW, and XPC) reviewed the transcripts to ensure data were sufficient to develop dependable interpretations about resident approaches and behaviors that lead to imparted OR autonomy and entrustment during residency. The research team reviewed regularly and discussed emergent themes until reaching consensus.

Results

A consistent theme of a 3-stage (rapport-entrustment-autonomy) method to gain operative autonomy emerged from interviews with all resident participants. Residents also reported that they commonly employed four strategies to construct this method to gain increased entrustment and autonomy in the OR: smart communication, attention to attending preferences, helpful allies, and visible attributes.

Method to gain autonomy

Based on resident descriptions, the method progresses from building rapport, developing mutual entrustment, and finally to obtaining autonomy (Fig. 1).

Stage 1: Building Rapport

Residents acknowledged that they must establish a professional relationship with the attending surgeon and be recognized in order to develop mutual entrustment with attending surgeons for more possible autonomy in future. As one resident noted:

"If I get my facial recognition in there, and they [Attending] know who I am, that down the road, they would be more willing to scrub with me alone or be willing to let me do more [in the OR]." [G0510]

Stage 2: Developing Entrustment

After establishing rapport and recognition with attending surgeons, residents then enhance entrustment within the professional relationship through demonstrating their clinical judgment, medical knowledge and diligence in attending to patients' needs. For example, one resident commented:

It's more than just technical ability. Even though you [resident] do most of your operating your fourth and fifth year ... your first three years, that's just patient care. That's actually where you build a reputation for being somebody who's thorough, somebody who learns, somebody who's knowledgeable, someone who listens. And then somebody can make a good plan or decision ... if you did a poorer job at that, then it would have been much more difficult for somebody [Attending] to say, "Go start the operation [without me scrubbing in]." [G0607]

Stage 3: Gaining Autonomy

Residents typically aim at gaining autonomy in their dealings with attending surgeons when these previously stages have been achieved. As one resident stated:

It helps a lot to have sat down [with Attending] and talked to one another before the case, because trust is two ways. You [Resident] have to trust the attending is trusting you to let you do things ... they're there to let you do things that they're not going to get mad or upset or something if you try to be more proactive ... that's where that trust starts to build, versus other ones [Attending] who are very standoffish. [G2607]

Four strategies to achieve autonomy

Residents reported using four common strategies to construct the above 3-stage method toward increased mutual entrustment and operative autonomy, according to the interviews. Table 1 provides representative quotes for each strategy.

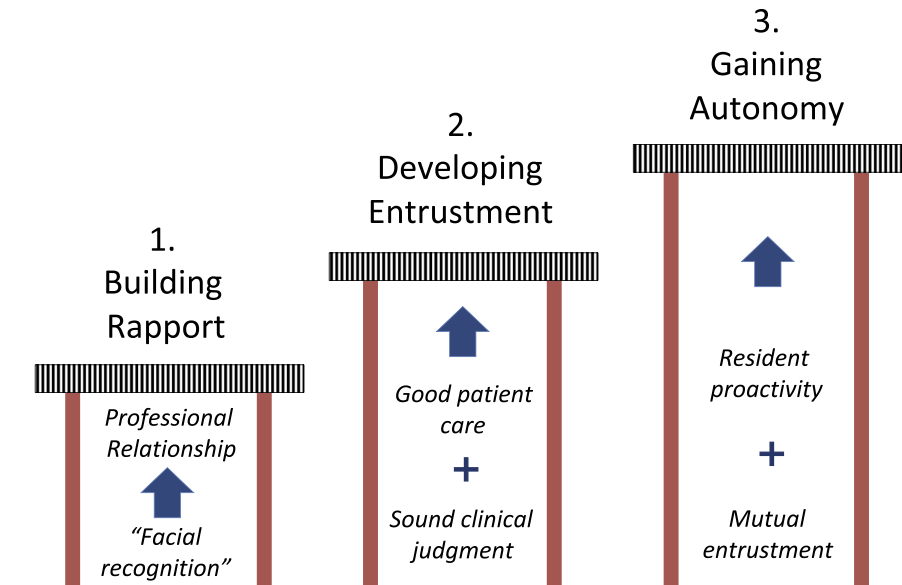


Fig. 1. Resident method to gain operative autonomy.

Table 1
Four groups of resident techniques to gain more operating room autonomy.

Code/Theme	Representative Quotes
Smart Communication	<p><i>During the case, I would say [to the Attending], “Okay, I see that you found the ureters at this location. Is this where you always look? What if you can’t find it there? Where else do you look?” Try to be very specific. Know that I’m thinking about the anatomy, and the danger zones, and so on and so forth. It’s just really demonstrating your cognizance about the fact that you can cause significant injury. I think most people [Attending] appreciate that. (General Surgery Senior)</i></p> <p><i>Instead of just saying [to the Attending], “Oh, I can’t feel the fundus,” you said, “I can’t feel the fundus, is it because of X or Y?” You show that you’ve demonstrated thought about why you couldn’t feel the fundus, and I think that’s important. (OB/GYN Junior)</i></p> <p><i>When we [residents] do that [ask Attending for feedback], it kind of is a reminder that hey, we’re here and we want to learn. Then, if they [Attending] have nothing to give us, it is a little clue that perhaps they did not let us do anything ... You can be like hey, I thought I was really struggling while I was doing this technical skill. Suggestions? Feedback? (General Surgery Junior)</i></p>
Mindful Observation	<p><i>If it’s my [resident] first time operating with an Attending, I’ll let them run the show, do their thing [and I observe]. Then, when I come in a second time, then I’ll essentially try to do a little bit more independently, especially in regards to how they like their patients prepped or draped or things like that. (General Surgery Senior)</i></p> <p><i>One thing that is beneficial is just repetition.. that the first time you’re scrubbing with an Attending, you’ll drape the wrong way—which is the right way for everyone else – but you’ll just drape the way they [Attending] don’t like, and so that can set the tone for everything as simple as where you put your stickies, or whatever. It’s helpful when you know how they [Attending] like to drape, which instruments you’re gonna need, where to put them. Even just simple things like that can change the tone of the case from the beginning ... That’s stuff that’s not always in the OR notes. That’s just more subtle. (General Surgery Senior)</i></p>
Helpful Allies	<p><i>A lot of times, if you [resident] don’t know [Attending preference], like getting there before the Attending gets there, is the way ... the Attendings usually have certain scrub techs that they always work with for certain cases. So, before [the Attending gets in the OR], you’re like [asking the scrub tech], “How does he [Attending] do this? What does he do that?” ... Most of the time they’re [the scrub tech] right. (General Surgery Senior)</i></p> <p><i>Sometimes scrubbing with the chief is piggybacking off of the Attending’s trust of the chief, and thus you [resident] get to do a lot more, where the Attending will step back ... and be like all right, show me what you guys can do. (General Surgery Junior)</i></p> <p><i>We know some Attendings who won’t let us [resident] do anything. I’d say they’re small numbers, but they really will not let us do anything, nor will they make an effort to teach, but they still expect us to be there. There are very few of them, but we know who they are. (OB/GYN Senior)</i></p>
Professional Attributes	<p><i>Demonstrating confidence going in will get you [resident] further. For example, if you’re in a GYN case, if they’re [Attending], “Hey, how many of these have you done?” You can say, “Yeah, I’ve done two that went really well,” just demonstrating confidence in your own abilities will make them more comfortable letting you do something, which is tough, especially when this is your second laparoscopic salpingectomy, but you’re, “Yeah, I did one before. It was great. I’m excited to do this one.” ... if you phrase it, “Well, I’ve only done one,” then you’re less likely to be allowed. (OB/GYN Junior)</i></p> <p><i>If you [resident] say when you don’t like something.. like, “I could do a better bite on that. I could do a better job on that,” they’ll [Attending] let you do it again. If you try to ignore the fact that you didn’t do great or try and cover it up, they’re watching. They’re not gonna let you get away with it, and then they trust you less. (OB/GYN Senior)</i></p> <p><i>It’s more than just technical ability. Even though you [resident] do most of your operating your fourth and fifth year ... your first three years, that’s just patient care. That’s actually where you build a reputation for being somebody who’s thorough, somebody who learns, somebody who’s knowledgeable, someone who listens. And then somebody can make a good plan or decision ... if you did a poorer job at that, then it would have been much more difficult for somebody [Attending] to say, “Go start the operation [without me scrubbing in]. (General Surgery Senior)</i></p>

Smart communication

Residents described using various active communication approaches to build trust and rapport with attending surgeons in the OR. This was especially true when the attending surgeon asked transactional questions (e.g. what is your next step?) and reflective

questions (e.g. what is your goal?). Two common communication approaches used by residents to gain increased trust and autonomy include:

- 1) Transforming attending surgeon’s proactive guidance to reactive guidance. For example, residents verbalized their

understanding of the anatomy they were visualizing, as well as described the next steps in the operation in order to share their thought process with the attending surgeons. Similarly, they stated operative challenges and their thoughts about how to approach them in order to demonstrate their clinical knowledge and seek attending feedback on how to proceed.

- 2) Building common ground and shared knowledge. For instance, prior to the surgical timeout of the case, residents tried to ensure the attending surgeon knew their previous experience and learning goals even when working with new tools, particularly when working with an attending surgeon for the first time.

Attention to attending preferences

Residents noted that paying particular attention to the subtle routine behaviors and individual OR preferences of attending surgeons would enhance their preparedness for the surgical case. Remembering and enacting these preferences in the operating room based on previous experience with a particular attending could lead to increased entrustment and autonomy. Residents also acknowledged there were many ways of doing the same surgical task and it is important to mimic these attending-specific preferences to demonstrate attention to detail of each surgeon's individual OR style.

Helpful allies

Residents reported seeking support and assistance from three types of surgical personnel (surgical scrub technician, chief residents, and attending surgeons) in order to strengthen their preparation for more entrustment and/or independent opportunities in the OR. Surgical scrub technicians usually were the best resource to learn attending surgeons' OR preferences, such as patient positioning, instrument and suture selection for a given case. Chief residents, who were already entrusted by the attending surgeon, also helped junior residents gain more "doing" opportunities through "piggyback entrustment" when scrubbing together. Attending surgeons who had a reputation for good operative teaching skills and granting residents OR autonomy also served as "helpful allies" with whom residents strategically aligned themselves. Residents preferentially scrubbed cases with attending surgeons that have a strong reputation for teaching.

Professional attributes

Residents reported seeking opportunities to demonstrate their professional attributes (e.g. preparation, patient care, confidence) to the attending surgeon and the OR team to enhance development of mutual entrustment and autonomy. Some residents mentioned that pre-operatively they would show their pre-operative planning by ensuring that appropriate equipment for the case is in the room and that they had studied for the case by asking well-considered questions. Intra-operatively, residents verbalized challenges they encounter in the operation. This demonstrates self-awareness of their own weaknesses and allows an opportunity for corrective guidance. Outside of the OR, residents described demonstrating professional communication by presenting a succinct and sound clinical plan for consults, timely communication of changes in patient clinical status on the floor and reliability in enacting patient care plans.

Discussion

In this study, we identified residents' perceived successful method toward increased entrustment and operative autonomy, as

well as four strategies reported by residents to construct such a method. These included smart communication, helpful allies, attention to attending preferences and visible attributes. This study finding not only elucidates the strategies utilized by residents to take charge of their own learning, demonstrate preparedness and gain autonomy, but also compliments our previous interview studies with expert surgical teachers about attending surgeons' approaches to examine resident real-time entrustability prior to granting resident autonomy in the OR. Attending surgeons above all are looking for safe surgical technique and rational thought processes in determining if they grant operative autonomy to residents.^{8,9} From our results we see that residents are trying to demonstrate these thoughts through their use of smart communication strategies. We suggest further interventions, which could improve resident entrustment, attending engagement and ultimately work to reduce the current crisis of confidence in the readiness of our general surgical trainees for independent practice.¹³

Residents perceive a 3-stage (rapport-entrustment-autonomy) method through which they pass to attain progressive operative autonomy. This method may not only progress through the whole residency training but also be applicable to a single service rotation. Residents recognized that first they had to have the attending understand who they were, then build professional entrustment all before finally gaining clinical autonomy. Rapport is an essential first stop in this method. This is supported by previous research by Sandu et al. demonstrating a positive correlation between an attending's "familiarity" with a resident and their intraoperative entrustment.¹⁴ However, the successful completion of this stage might be hampered by resident rotation schedules, which limit resident rotation weeks in certain services. Further steps for investigation and possible enhancement to assist resident autonomy development could include optimizing resident rotation structure to provide more continuity on each service and using educational interventions, such as an apprentice model allowing for the residents to become "part of the team" and having their individual learning needs met more accurately.¹⁵ In addition, research on resident duty hours and the reduced patient care continuity has demonstrated no change in case volume or patient safety but it may be overlooking the impaired development of rapport with attending surgeons.¹⁶

In the current surgical education system, it is ultimately up to the resident to demonstrate their surgical competencies to the attending surgeons in order to initiate the construction of mutual clinical entrustment. Some expectations for residents are not written down but are instead implicit rules and etiquette. Junior residents are instructed in these etiquettes by their seniors or they are gleaned from immersion in the culture of surgery initially encountered as medical students. Our study fills this gap by explicitly exploring the strategies that residents use to demonstrate their readiness for entrustment. Previous studies have demonstrated the reliance of autonomy on entrustability. However, there is conflicting evidence in the literature regarding the utility of these resident driven behaviors. Chen et al. found that attendings routinely use direct communication and observation of resident behaviors to determine entrustability.⁹ Video-based interviews of faculty also demonstrated a wide variation in the assessment of successful attainment of operative procedures and the execution of surgical tenants.¹⁷ Together these studies indicate that residents strive to demonstrate their entrustment through specific behaviors but also may be hampered by various personal and contextual factors.

Once progressing to the stage of gaining autonomy, our results indicate that residents are more forthright in their communication. They assert their independence by more readily expressing their

previous experience and what they expect to do in a case. This technique is supported by previous research, which has demonstrated that attending surgeons modulate their guidance in the operating room according to the previous experience of a resident.¹⁸ Previous studies have demonstrated that the strongest predictor in resident autonomy is the resident performance itself closely followed by the typical autonomy provided by a specific attending surgeon.¹⁹ A barrier to this step is incongruent personality traits between trainee and attending which can inhibit the development of personal rapport. Incongruent personality pairs have been shown to lead to decreased resident autonomy.²⁰

Our study ultimately sheds light on the remarkable similarities between previously established expectations of attending surgeons (Chen et al.) and the resident expectations for themselves. We have seen detailed in this study the tremendous effort that residents place in attaining operative autonomy and the seriousness with which they take this progression. Similarly, attending surgeons overall want to provide a meaningful learning experience for residents. Both parties desire to provide excellent patient care. We expect that by establishing a common framework for expectations that we can begin to ensure that the dialogue for the development of resident autonomy can have a starting framework. In combination with previous studies our results indicate that a two-party approach is necessary to improve resident efficacy in regard to operative autonomy.

Residents should work on developing communication strategies that ensure smart framing of questions that demonstrate their metacognition and engage the attending in teaching for deep learning. Previous research has demonstrated that the majority of resident questions are transactional in nature and do not reflect meta-cognition, indicating that while residents may understand that they need to ask questions intelligently they are not succeeding in this task.²¹ Teaching residents about questioning skills would be a reasonable next step to ensure residents are demonstrating their intellect as well as maximizing their learning from each case. This would include instruction in reflective questioning toward the goal of expanding their understanding of the “why” and the “what if” aspects of the operation. Faculty development is also recommended to better support this intervention. The attending half of the student-teacher dyad should work to ensure they are effectively engaging the resident learner and providing opportunities for growth in intellectual and technical skill. Swendimen et al. identified exceptional surgical educators were individuals who could create a culture of psychological safety, grant progressive autonomy, hold trainees accountable and the ability to individualize teaching for the trainee.²² The faculty development to advance attendings skill in implementing these techniques in their operating rooms could lead to the creation of an improved culture of education.

There are several limitations to this study. First, this is a qualitative study relying on the self-reporting of residents and their perceptions. Further studies with in vivo direct observation of resident behavior in the OR that leads to increased autonomy would allow for more definitive data on the actual success rate of these techniques. Second, it was a single institution study that may limit our findings' transferability to other programs. However, this study provides a novel description of the methods that residents use to gain autonomy, which provides a foundation for further exploration and development of programs to augment the residents already refined skills in this arena. Third, the cognitive bias of the interviewees could influence the results of the study due to the qualitative nature of the study. A follow-up study with a larger sample size is necessary to further generalize our findings. Finally, selection bias may have skewed our findings with the inclusion of residents more invested in their training or with more strong

feelings about their training. This may have been partially mitigated by our attempts to increase our response rate, the credibility and transferability of our study.

Conclusions

The goal of this study was to explore the resident construct for their perceived successful method of actions and behaviors that lead to imparted OR autonomy and entrustment during residency. Residents report a progressive 3-stage method to gain operative autonomy progressing from building rapport, developing mutual entrustment and finally to obtaining autonomy. We also identified 4 common strategies used by residents to construct this method: smart communication, attention to attending preferences, helpful allies, and visible attributes. Our findings provide insights into resident strategies to achieve progressive autonomy and entrustment in the OR. Better understanding of resident approaches, and the challenges that they face, have the potential to significantly enhance resident OR training efficiency as well as resident autonomy and successful completion of surgical entrustable professional activities.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Declaration of competing interest

The authors report no proprietary or commercial interest in any product mentioned or concept discussed in the article. RS sits on advisory boards for Astra Zeneca, Clovis, Tesaro, Ethicon, Genentech and Genmab. RS also is on the speaker's bureau for Genentech.

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