

What factors influence attending surgeon decisions about resident autonomy in the operating room?

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Background. Educating residents in the operating room requires balancing patient safety, operating room efficiency demands, and resident learning needs. This study explores 4 factors that influence the amount of autonomy supervising surgeons afford to residents.

Methods. We evaluated 7,297 operations performed by 487 general surgery residents and evaluated by 424 supervising surgeons from 14 training programs. The primary outcome measure was supervising surgeon autonomy granted to the resident during the operative procedure. Predictor variables included resident performance on that case, supervising surgeon history with granting autonomy, resident training level, and case difficulty.

Results. Resident performance was the strongest predictor of autonomy granted. Typical autonomy by supervising surgeon was the second most important predictor. Each additional factor led to a smaller but still significant improvement in ability to predict the supervising surgeon's autonomy decision. The 4 factors together accounted for 54% of decision variance ($r = 0.74$).

Conclusion. Residents' operative performance in each case was the strongest predictor of how much autonomy was allowed in that case. Typical autonomy granted by the supervising surgeon, the second most important predictor, is unrelated to resident proficiency and warrants efforts to ensure that residents perform each procedure with many different supervisors. (Surgery 2017;■.■.■.)

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SUPERVISING SURGEONS must balance patient safety, operating room efficiency, and resident learning needs when deciding how much guidance to provide residents during operative procedures. Progressively less guidance or, inversely, progressively more autonomy is required if residents are to learn to perform procedures independently by the completion of training. The precise means by which supervising surgeons make these decisions remains a mystery, yet an improved understanding of these decision processes could help identify

ways to enhance the quality of surgical training. With this goal in mind, several prior research efforts have investigated factors that influence surgical supervisors' guidance of residents in the operating room. Chen et al¹ reported that residents with more years of surgical training were afforded more autonomy by the supervisor and that the quality of the trainees' performance was a determinant of the amount of autonomy afforded to them. These investigators also observed that the amount of autonomy individual attending surgeons provided to residents in the operating room depended to a great extent on the attending surgeon. However, the study was based on a single residency training program and, as a result, the number of trainees and attending surgeons was small. In addition, the study was limited to trainee performance of 5 common operative procedures. Most importantly, the study investigated the effects of each variable separately. Because these variables are correlated with each other (eg, the quality of the performance is correlated with years of training), the unique contribution of each variable needs to be determined controlling for the impact of other variables studied.

In a similar study, George et al² investigated the guidance behavior of 27 supervising surgeons in a single institution who rated 31 resident performances of 1,490 operations covering 127 different procedures. They found that the amount of autonomy afforded residents increased with number of years of training, except that the average amount of autonomy afforded to fourth- and fifth-year trainees did not differ. The difficulty of the case was inversely associated with the level of autonomy. Supervising surgeons afforded more guidance/less autonomy to trainees for cases viewed as more difficult. As part of their study, George et al investigated the relationship between rating of operative performance quality (using 2 different operative performance instruments) and the amount of autonomy afforded to the trainee. They found that better operative performance led the supervising surgeon to afford the resident more autonomy. In this study, surgeons who rated the operative performance were blinded to the autonomy rating assigned by the supervising surgeon.

Torbeck et al³ approached the study of guidance from a different perspective. In a 2-program study, these investigators explored the opinions of supervising surgeons and trainees about supervising surgeon operating room guidance practices. Respondents reported that the level of resident training affected the amount of guidance provided. Faculty supervisors and residents agreed

on this finding. However, the residents thought that guidance practices changed less with increased training than did the faculty supervisors.

This study is designed to add to the understanding of what motivates attending surgeons to allow more operating room autonomy by investigating 4 factors likely to influence the level of autonomy granted. The study expands the understanding of factors established in earlier research by 1) increasing the number of training programs studied to 14 and 2) increasing the number of attending surgeons, residents, and procedures studied. It adds investigation of the typical guidance practices of each supervising surgeon as a potential determinant of the autonomy afforded for individual resident operative performances, and most importantly it investigates the effect of each variable while controlling for the effects of the other variables studied. The primary outcome measure was the attending surgeon's decision regarding the level of autonomy afforded during the case as reported by the attending surgeon using a previously described smartphone-based operative performance assessment system known as SIMPL.⁴ The 4 influencing factors investigated included the 1) resident's operative performance during the case as reported by the attending surgeon, 2) attending surgeon's typical operating room guidance practices, 3) difficulty of the case, and 4) resident experience level (postgraduate year of surgical training). A better understanding of these 4 factors will help attending surgeons and program administrators balance multiple important goals while ensuring that surgical residents are afforded opportunities for progressively independent practice.

METHODS

Data. The results of this study are based on supervising surgeon ratings of categorical general surgery residents for operations performed between September 2015 and June 30, 2016 in 14 residency training programs. The attending surgeons were aware of each resident's level of training (postgraduate training year). These operations included the range of procedures performed by residents in these programs and rated by attending surgeons. For each operative performance, the attending surgeon reported the level of autonomy afforded to the resident using the 4-point Zwisch scale: 1) Show and Tell (the resident observed and learned), 2) Active Help (the attending surgeon alternated between showing and assisting and provided significant guidance throughout the case), 3) Passive Help (the attending surgeon primarily functioned as an assistant to the

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