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Residents' perception of skill decay during dedicated research time



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ABSTRACT

Background: Surgery residents may take years away from clinical responsibilities for dedicated research time. As part of a longitudinal project, the study aim was to investigate residents' perceptions of clinical skill reduction during dedicated research time. Our hypothesis was that residents would perceive a greater potential reduction in skill during research time for procedures they were less confident in performing.

Materials and methods: Surgical residents engaged in dedicated research training at multiple training programs participated in four simulated procedures: urinary catheterization, subclavian central line, bowel anastomosis, and laparoscopic ventral hernia (LVH) repair. Using preprocedure and postprocedure surveys, participants rated procedures for confidence and difficulty. Residents also indicated the perceived level of skills reduction for the four procedures as a result of time in the laboratory.

Results: Thirty-eight residents (55% female) completed the four clinical simulators. Participants had between 0–36 mo in a laboratory ($M = 9.29$ mo, standard deviation = 9.38). Preprocedure surveys noted lower confidence and higher perceived difficulty for performing the LVH repair followed by bowel anastomosis, central line insertion, and urinary catheterization ($P < 0.05$). Residents perceived the greatest reduction in bowel anastomosis and LVH repair skills compared with urinary catheterization and subclavian central line insertion ($P < 0.001$). Postprocedure surveys showed significant effects of the simulation scenarios on resident perception for urinary catheterization ($P < 0.05$) and LVH repair ($P < 0.05$).

Conclusions: Residents in this study expected greater skills decay for the procedures they had lower confidence performing and greater perceived difficulty. In addition, carefully adapted simulation scenarios had a significant effect on resident perception and may provide a mechanism for maintaining skills and keeping confidence grounded in experience.

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1. Introduction

Concerns over resident readiness for operative independence have contributed to national discussions on the general

surgery training curriculum [1–6]. Restructuring of the training curriculum [7], including changing the length of training [8], timing of specialization [8], and adding transition to care fellowships, is currently being debated [5,6].

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Interestingly, there has been less discussion regarding the impact dedicated research time during residency has on surgical knowledge and skill acquisition. Residents that pursue research experiences in the middle of residency interrupt their clinical skills training before reaching mastery in certain skills. This may leave them vulnerable for skills decay and contribute to a lack of competency at the end of residency training.

General surgery training is unique in that many programs offer residents the opportunity to perform 1 y to 3 y of dedicated research time during the middle of residency training [9]. Almost 40% of residents training at Accreditation Council for Graduate Medical Education and National Resident Matching Program affiliated programs spend at least 1 y engaged in research [10]. The vast majority of residents start their dedicated research time after 2 y or 3 y of clinical training [10]. Although residents engaged in dedicated research training are significantly more likely to pursue fellowship training and less likely to hold private practice positions, little is known about how this research time affects operative performance [10,11].

Residents who pursue research experience may return to clinical practice with less surgical knowledge and skill than their peers who do not take time away for research. Factors known to contribute to skills decay include time away from task performance; level of knowledge mastery before time away and task characteristics [12,13]. There is a lack of research on skills decay during surgical research fellowships. Moreover, it is not known how skills decay during research fellowships impacts resident competency at the end of their training. Evaluating the potential reduction in surgical skill and knowledge during dedicated research time is critical to ensuring competent, independent performance at the end of training.

The aim of this study was to investigate residents' perceptions of clinical skill reduction during dedicated research time. We sought to evaluate the relationship between residents' perceived skill reduction, procedural confidence, and perceived task difficulty before and after performing simulation-based procedures. Our hypothesis was that residents would perceive a greater potential reduction in skill during research time for procedures they were less confident in performing. Our hypothesis is in line with other research noting that previously mastered skills are less prone to skills decay [12].

2. Methods

2.1. Setting and participants

Study participants ($n = 38$) were residents engaged in dedicated laboratory time from multiple general surgery training programs enrolled in a longitudinal simulation-based assessment study. This article evaluates data from the first data collection period of a longitudinal simulation-based assessment study. Residents who were currently in their clinical training were excluded from this study. Data collection occurred at five sites in three midwestern cities: Madison, WI; Chicago, IL; and Rochester, MN.

This study was approved by the University of Wisconsin Institutional Review Board and written informed consent was obtained from all participants.

2.2. Surveys

2.2.1. General survey

Before performing the simulated procedures, residents completed a general survey designed to collect information on demographics, years of general surgery training, years of dedicated laboratory work, and current call schedule. This survey also used a 5-point Likert scale to assess perceived reduction in global clinical and surgical skills and procedure-specific (urinary catheterization, subclavian central line insertion, bowel anastomosis, and laparoscopic ventral hernia [LVH] repair) performance during dedicated laboratory time.

2.2.2. Procedure related surveys

After the general survey, residents completed a preprocedure survey designed to assess confidence in and perceived difficulty in performing specific procedure steps and the entire surgical task. Survey items for each procedure are as follows: urinary catheterization (identify anatomy, problem solve difficulties with insertion, and successfully perform entire procedure); subclavian central line insertion (identify landmarks, cannulate the subclavian vein, and successfully perform entire procedure); bowel anastomosis (select correct suture, select correct stitch, and successfully perform entire procedure); and LVH repair (plan port placement, completely visualize the hernia defect, and successfully perform entire procedure). Confidence and perceived difficulty was assessed using a 5-point Likert scale (1 = Not confident; 5 = Extremely confident; and 1 = Not difficult; 5 = Extremely difficult, respectively). After completing each simulated procedure, residents completed a postprocedure survey designed to re-assess confidence and perceived difficulty of performing the surgical tasks. The same questions and 5-point Likert scales were used in the preprocedure survey and postprocedure survey.

2.3. Simulated procedures

After completing the general survey and preprocedure survey, participants completed the four simulated clinical procedures: urinary catheterization, subclavian central line insertion, bowel anastomosis, and LVH repair. These procedures were purposefully selected and designed to provide opportunities for both decision making and technical skill performance. Participants had 15 min to complete each simulated task with additional transition time between stations. This amount of time was selected to balance data collection requirements with participant fatigue. Simulator development was based on prior cognitive task analysis [14–16], and all stations were reviewed by experts before data collection. The focus of each station was predetermined to allow for participants to engage in major decisions and technical hurdles. The procedures were randomized with a Latin square. Before starting each station, researchers read an introductory narrative providing information on the simulator

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