

At Home Preresidency Preparation for General Surgery Internship: A Pilot Study^{☆, ☆ ☆}

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OBJECTIVE: To create a novel “at-home” preresidency preparatory adjunct for medical students entering surgical residency.

DESIGN: Preparatory resources were mailed to match medical students before residency matriculation in 2015. This included “how-to” videos, low-cost models, and surgical instruments for 5 “stations” (arterial blood gas analysis, anatomy and imaging knowledge, knot tying ability, and suturing dexterity) of our program’s biannual general surgery intern objective assessment activity (Surgical Olympics: total 13 stations, 10 points each). Scores from 2015 were compared with 2014 historical controls in a retrospective manner using the Student’s *t*-test.

SETTING: Academic, tertiary care referral center with a large general surgery training program.

PARTICIPANTS: Postgraduate year 1 general surgery trainees (interns) from the years 2014 and 2015.

RESULTS: Twenty-six interns participated in the 2015 assessment and were compared to thirty-two 2014 interns. Overall mean scores were low, but higher (19.7 vs. 15.4, $p = 0.04$) in the 2015 class. The largest increase was noted in the anatomy knowledge station (mean = 5.0 vs. 1.9, $p < 0.01$). Scores in stations assessing technical competence were similar to controls. The number of perfect scores among the 5 stations was higher (10 vs. 5) in the 2015 group. Mean scores from the

other 8 stations, for which no resources were mailed, showed no difference (29.3 vs. 28.3, $p = 0.75$).

CONCLUSIONS: Enacting a simple, home-based curriculum for medical students before surgical residency, improved performance on early knowledge assessments. (J Surg Ed ■■■■-■■■. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Surgical education, Simulation, Deliberate practice, Repetition, Preresidency preparation

COMPETENCIES: Practice-Based Learning and Improvement, System-based Practice

INTRODUCTION

The transition for matriculating students from medical school to Day 1 of surgical internship can be overwhelming. Although these novice physicians have significant medical knowledge, anxiety and lack of experiential confidence may initially hamper their performance in the clinic, hospital, and operating room. To combat this difficulty, a number of institutions have implemented various curricula targeted toward senior medical students who will enter surgical internships.¹⁻⁴ Through these “boot camps” and simulation efforts, student confidence and preparation have been shown to improve.¹⁻⁴ In late 2014, initial single-institution experiences coupled with increasing concerns over lack of surgical intern preparedness, prompted surgical governing bodies including the American Board of Surgery, American College of Surgeons, Association of Program Directors in Surgery, and Association for Surgical Education to issue a statement endorsing preresidency preparatory courses.⁵⁻⁹ A national

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multidimensional curriculum including objective assessments was developed and medical schools were encouraged to adopt it.

Despite such endeavors, the number of training-related hurdles faced by surgical and medical residents alike seems to grow with each passing year. Duty-hour regulations, advancements in medical technology, and the doubling of medical information every decade create educational stressors that challenge the ability of trainees to transition from a beginner to expert by the end of 3-5 years of residency. Such evolution is especially critical for surgical specialties where technical skill acquisition is required. We believe that surgical mastery is largely repetition dependent and therefore more efforts are needed to increase opportunities for repetition.¹⁰ In the context of the previously mentioned educational obstacles, simulation, and video-based learning strategies are rapidly growing arenas, which can offer a controlled environment to accrue additional experience.¹¹

In the spirit of preresidency preparatory courses and the known benefits of surgical simulation and video education, we aimed to create a novel “at-home” adjunct for surgical internship preparation. Our main objective was to develop a simple, low-cost, and practical curriculum, which our recently National Resident Matching Program-matched medical students could use at their convenience, to augment their transition to our surgical residency. The main outcome measure was change in baseline assessment scores. This article represents our pilot efforts with this initiative.

MATERIALS AND METHODS

Our study was part of an initiative for research in simulation education, approved by the Institutional Review Board at Mayo Clinic. All study participants provided informed consent before matriculation. All data were de-identified after collection.

One month before matriculation, our 2015 to 2016 incoming general surgery interns were each mailed a package of educational supplies. The package included surgical instruments, low-cost models, suture, and a Universal Serial Bus drive with instructional videos. Collectively, these resources allowed the future trainee to practice suturing dexterity and knot tying ability, chest x-ray [CXR] and arterial blood gas [ABG] interpretation, and abdominal anatomy knowledge. These 5 tasks were chosen due to their simplicity, ease of mailing, low cost, and relevance to surgical internship. Table 1 summarizes each task and the supplies provided. Total cost was roughly \$22 per package, inclusive of shipping (range: \$21-\$30).

Each of these 5 tasks is included within “stations” from our program’s biannual intern objective assessment activity (Surgical Olympics). The suturing dexterity and knot tying ability tasks each accounted for individual Surgical Olympics stations. The abdominal anatomy, CXR interpretation, and ABG analysis tasks were portions of a larger station (upper abdominal anatomy reconstruction station, imaging station, and trauma/critical care stations, respectively). Collectively, these 5 stations accounted for 50 points of the total 130 points possible (total 13 stations, 10 points each) in the Surgical Olympics. This 10 point-per-station system is a scaled rubric because of varying units inherent to the raw (unconverted) scores for each task. Our trainees over the past 11 years have felt it to be an extremely difficult objective structured clinical examination-type test with a tough scoring system.

Instructional videos outlined proper technique for the technical skills (knot tying and suturing) and step-by-step approaches for the knowledge skills (CXR and ABG interpretation, abdominal anatomy). Videos provided tips and tricks on how to score highly on the 5 related stations in the Surgical Olympics. The future interns were explicitly told that they would be assessed on these and other tasks upon matriculation in July; they understood that such an

TABLE 1. Preresidency Preparatory Supplies

Task	Supplies Provided	Instructional “How-To” Video	Referent Surgical Olympics Station
Knot tying ability	Thread × 20	Yes	Knot tying
Suturing dexterity	Needle driver Skin forceps Scissors 3–0 absorbable suture × 5	Yes	Suturing
Abdominal anatomy	Low-cost felt skin model Low-cost felt abdominal anatomy model	Yes	Anatomy knowledge
CXR interpretation	Powerpoint with multiple normal and abnormal chest x-rays ABCDE method of interpretation	Yes	Imaging
ABG analysis	ABG examples, interpretations and explanations	Yes	Trauma/critical care

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