A Comprehensive, High-Quality Orthopedic Intern Surgical Skills Program

Samuel E. Ford, MD, Joshua C. Patt, MD, and Brian P. Scannell, MD

Department of Orthopaedic Surgery, Carolinas Medical Center, Charlotte, North Carolina

OBJECTIVES: To design and implement a month-long, low-cost, comprehensive surgical skills curriculum built to address the needs of orthopedic surgery interns with high satisfaction among both interns and faculty.

DESIGN: The study design was retrospective and descriptive.

SETTING: The study was conducted at tertiary care referral center with a medium sized orthopedic residency surgery program (5 residents/year).

PARTICIPANTS: Totally 5 orthopedic surgery residents and 16 orthopedic surgery faculty participated.

RESULTS: A general mission was established—to orient the resident to the postgraduate year 1 and prepare them for success in residency. The basic tenets of the American Board of Orthopaedic Surgeons surgical skills program framework were built. Curricular additions included anatomic study, surgical approaches, joint-specific physical examination, radiographic interpretation, preoperative planning, reduction techniques, basic emergency and operating room procedures, cadaveric procedure practice, and introduction to arthroplasty. The program was held in August during protected time for intern participants. In total, 16 orthopedic surgeons instructed 85% of the educational sessions. One faculty member did most of the preparation and organization to facilitate the program. The program ran for a cumulative 89 hours, including 14.5 hours working with cadaveric specimens. The program cost a total of $8100. The average module received a 4.15 rating on a 5-point scale, with 4 representing "good" and 5 representing "excellent."

CONCLUSIONS: The program was appropriately timed and addressed topics relevant to the intern without sacrificing clinical experience or burdening inpatient services with interns' absence. The program received high satisfaction ratings from both the interns as well as the faculty. Additionally, the program fostered early relationships between interns and faculty—an unforeseen benefit. In the future, our program plans to better integrate validated learning metrics and improve instruction pertaining to both fluoroscopic examination and arthrocentesis. (J Surg Ed 73:553-558. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: orthopedic surgery, surgical skills, education, simulation, intern, ABOS

COMPETENCIES: Practice-Based Learning and Improvement, Medical Knowledge

INTRODUCTION

As the emphasis of patient care focuses on efficiency and patient safety, procedural training is being transitioned out of hospitals and into simulation laboratories.[1] The early stages of motor skills acquisition may take place outside of the operating room (OR) via models and simulators.[1,2] Evolution of traditional training paradigms must take place in a careful, objectively evaluated manner.[2] Advances in surgical skills training in general surgery predate those in orthopedics and serve as a basis for improvements in orthopedic training.[1]

In 1999, Anastakis et al.[3] showed that technical skills acquired on a low fidelity bench model was transferred to a cadaveric human model. Microsurgical technical skill acquisition from bench model trainers has been shown to be durable at 4-month follow-up by Grober et al,[4] although a correlation between interim live OR microsurgical opportunities and skill retention clouds these results. Certain laparoscopic virtual reality and box trainer systems have improved OR performance, particularly when combined with didactic training.[5-7] A total of 2 general surgery residency programs, at the University of Minnesota and the University of Connecticut, have published details regarding their surgical skills curricula, although only the program at the University of Connecticut meaningfully

Correspondence: Inquiries to Brian P. Scannell, MD, Department of Orthopaedic Surgery, Carolinas Medical Center, 1025 Morehead Medical Drive, Suite 300, Charlotte, NC 28203.; e-mail: brian.scannell@carolinas.org

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integrates surgical skills acquisition.[8,9] In the said program, interns participate in 2.5 hours knowledge-based and procedural skills sessions twice weekly over the course of 2 months. They report increased intern confidence with basic intensive care unit procedures and improvement in intern performance on in-training examinations.[9] Overall, it is clear from evidence in general surgery that a well-designed surgical skills curriculum has the potential to enhance postgraduate year (PGY)-1 education in orthopedic surgery residency.

In total, 2 national surveys of program directors and residents performed by Karam et al.[10] and Hall et al.[11] reveal a disconnect between surgical skills training ideals and current implementation. As of June 2011, 54% of program directors had no surgical skills curriculum in place beyond basic anatomy and intermittent exercises with surrogate bone models.[10] Even among programs with more developed ones, few provide protected time to ensure resident participation and benefit.[10] Over 75% of both residents and program directors agree that surgical skill simulations should become a part of formal training and welcome a standardized surgical skills curriculum.[10] Unfortunately, residency program directors most frequently cite funding limitations as a significant barrier to implementing more robust programs.[2,10]

Regardless of the barriers that face residency programs, the American Board of Orthopaedic Surgeons (ABOS) now requires that orthopedic surgery residencies integrate a surgical skills program into the PGY-1 training year. Provided either longitudinally or as part of a dedicated rotation, a basic curriculum must include skills used in the initial management of injured patients and basic operative skills.[12] A surgical skills curriculum was developed at Carolinas Medical Center (CMC) using this framework as a foundation. It was hypothesized that a month-long surgical skills program built to address the needs of orthopedic interns can be implemented with high satisfaction among both intern participants and faculty instructors.

METHODS

An internal evaluation of the needs of a PGY-1 resident was conducted and additional topics of focus were identified. Teaching faculty of the CMC orthopedic surgery program were contacted well in advance to organize a smooth, efficient surgical skills curriculum.

A 1600+ square-foot on-campus surgical training laboratory already used for longitudinal resident instruction by the residency program was identified as the clear location of preference for most of the skills program. This laboratory is used by our hospital system to host continuing medical education (CME) instructional courses, and has complete wet and dry laboratory capabilities.

Both resident and teaching faculty feedbacks were invited via timely anonymous survey requests following the surgical skills month. A numeric rating scale was equated to the subjective survey result: 1—poor, 2—below average, 3—adequate, 4—good, and 5—excellent. Subsequent resident satisfaction statistics were then calculated. Also, an "hours-weighted" satisfaction average was calculated by weighting a session's rating by the length of the session.

Total cost figures incurred by the department to run the program were tabulated and summed for basic analysis.

RESULTS

Through the program development process, a general mission was established: to orient the resident to the PGY-1 year and prepare them for success in residency. To best fulfill these aims, curricular adjuncts, including anatomy and surgical approaches, physical examination, preoperative planning, basic OR, and emergency department procedures, etc., were incorporated into the basic ABOS surgical skills program framework (Fig.).

The surgical skills program was hosted in August, a month following PGY-1 introduction to clinical rotations within the health care system. All 5 PGY-1 interns were scheduled to be on an orthopedic rotation during this month to facilitate protected participation. Residents met for instruction each weekday afternoon from 1 PM to 5 PM for the course. Faculty led the educational sessions 85% of the time; senior residents instructed the remaining sessions. A total of 16 orthopedic faculty instructed at least 1 module during the program. Although some were more involved than others, faculty surgeons averaged 4.5 hours of teaching each and were involved in a mean of 1.5 sessions. This did not include faculty preparation time needed for the session, but most of the preparation and organization of each session was performed by 1 faculty member, which totaled ~60 hours for the month-long session.

The resultant curriculum included 89 total hours of instruction, including 15.5 hours in surrogate bone model laboratories, 14.5 hours in cadaver laboratories, and 10

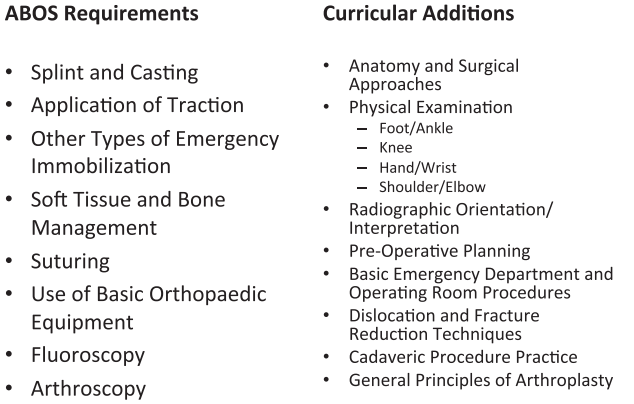

FIGURE. Comparison of basic ABOS surgical skills program requirements and curricular adjuncts identified and included in the surgical skills program at CMC.