

An Evaluation of the Utility of an Orthopaedic Surgery Rotation for Emergency Medicine Residents

JOSEPH A. GIL, MD; STEVEN F. DEFRODA, MD; ADAM JANICKI, MD; JESSICA SMITH, MD; CRAIG EBERSON, MD

ABSTRACT

OBJECTIVES: In collaboration with the Department of Emergency Medicine, we designed a hands-on orthopaedic rotation for emergency residents in their first postgraduate year (PGY1) to introduce them to the appropriate evaluation and management of common orthopaedic injuries and conditions. Our hypothesis was that after the rotation, emergency medicine residents would be more comfortable with the evaluation and management of these injuries and conditions.

METHODS: We designed a survey for the emergency medicine residents to query the pre- and post-rotation level of comfort in the management of some of the most commonly encountered orthopaedic injuries and conditions that present to the emergency department.

RESULTS: Seventeen PGY1 emergency medicine residents completed the orthopaedic surgery rotation at the time the survey was distributed. Sixteen (94%) completed the questionnaire. Wilcoxon matched pairs testing based on the overall Likert score prior to and after completion of the orthopaedic rotation revealed that the overall Likert score after the rotation was significantly higher (19.4 ± 5 vs. 27 ± 3.6 ; $P=0.00098$). Comparison of each of the 9 knowledge and skill areas assessed by the questionnaire revealed that the respondents were significantly more comfortable in all of these core content areas ($P<0.01$).

CONCLUSION: The orthopaedic rotation designed in collaboration with the emergency medicine residency program may be a useful model for musculoskeletal education for non-orthopaedic surgery residents.

KEYWORDS: musculoskeletal education, orthopaedic surgery, emergency medicine, medical education, postgraduate medical education

INTRODUCTION

More than 1 out of every 7 patients evaluated in the emergency department present with an orthopaedic problem.¹ Despite the frequency of orthopaedic injuries encountered in the emergency department (ED), the Accreditation Council for Graduate Medical Education (ACGME) has not identified a specific methodology for teaching orthopaedics during emergency medicine residency training, and identifies only

one orthopaedic key index procedure ("dislocation reduction") in its Common Program Requirements for emergency medicine training.² In 2006, the American Orthopaedic Association identified diminishing coverage of community emergency departments by orthopaedic surgeons as a critical issue.³ As access to consulting orthopaedic surgeons in community emergency departments continues to decrease, emergency medicine physicians will have a larger role in the primary management of orthopaedic injuries and conditions. A dilemma arises as a result of this increasing responsibility of emergency medicine physicians because undergraduate medical education alone does not adequately prepare new residents to evaluate and manage musculoskeletal injuries and conditions.^{1,4-6} These critical skills must be learned during residency training.

At our institution, in collaboration with the Department of Emergency Medicine, we designed a hands-on orthopaedic rotation for emergency medicine residents. The rotation was designed to introduce emergency medicine residents in their first postgraduate year (PGY1) to the appropriate evaluation and management of common orthopaedic injuries and conditions presenting to the emergency department. In our educational model, the emergency medicine resident is paired with a second postgraduate year (PGY2) orthopaedic surgery resident who is responsible for all ED orthopaedic consultations. This model was chosen to maximize the emergency medicine resident's opportunity to learn how to assimilate pertinent information from the history and physical exam, develop a working diagnosis, and perform necessary emergent stabilization or procedures with appropriate supervision. The emergency medicine resident is required to attend daily orthopaedic trauma conference where all consults from the emergency department from the previous 24 hours are presented. The discussion during this conference gives the emergency medicine resident an additional opportunity to understand the thought process associated with every consultation, reinforcing learning points. Additionally, the emergency medicine residents are provided with a reading curriculum for the rotation that introduces them to core orthopaedic principles required to effectively provide acute care for orthopaedic injuries and conditions in the emergency department. Our hypothesis was that after completion of the rotation, the emergency medicine residents would be more comfortable with the evaluation and management of orthopaedic injuries and conditions.

METHODS

In the 2014–15 academic year, the Emergency Medicine residency at Rhode Island Hospital implemented a one-month orthopaedic consult rotation for their PGY1 residents. The resident spent 3 evenings a week taking overnight ED call with the consulting orthopaedic resident. To evaluate the efficacy of the rotation, we designed and retrospectively distributed an 18-question survey to the ED residents who completed the rotation during their intern year. The nine core content knowledge and skill areas that were assessed included the following: (1) ankle fractures; (2) distal radius fractures; (3) open fractures; (4) knee arthrocentesis; (5) basic extremity splinting; (6) fingertip injuries; (7) extremity radiographs; (8) post-emergency orthopaedic care; (9) post-emergency room orthopaedic complications. Two questions for each area corresponded to the level of comfort with the knowledge or skill area before and after the rotation. The responses to the questions were designed using a Likert score. This subsequently allowed comparison of each skill area as well as comparison of the overall Likert score before and after completing the orthopaedic surgery rotations. We did not seek IRB approval given that the initial intention of the survey was to anonymously review the success of an orthopaedic rotation that was already implemented into the emergency medicine residency curriculum. Given the success of the rotation, we wrote the manuscript to bring attention to the rotation as a potential model for musculoskeletal education for emergency medicine residents.

The survey was distributed via the REDCap (Research Electronic Data Capture) program (Vanderbilt University, Nashville, TN) in December 2015. Study data was also collected and managed using the REDCap program, a tool provided by the Lifespan Biostatistics Core. REDCap program is a secure, web-based application designed to support data capture for research studies. REDCap program does not record IP addresses. There were no incentives for participation and participation was voluntary. Statistical analysis was performed utilizing Microsoft Excel (Microsoft Corporation, Redmond, WA) and StatPlus: LE (AnalystSoft Inc., Walnut, CA). A P value of <0.05 was defined as statistically significant. The Wilcoxon paired test was utilized to compare the overall nonparametric Likert score and the nonparametric Likert score for each question.

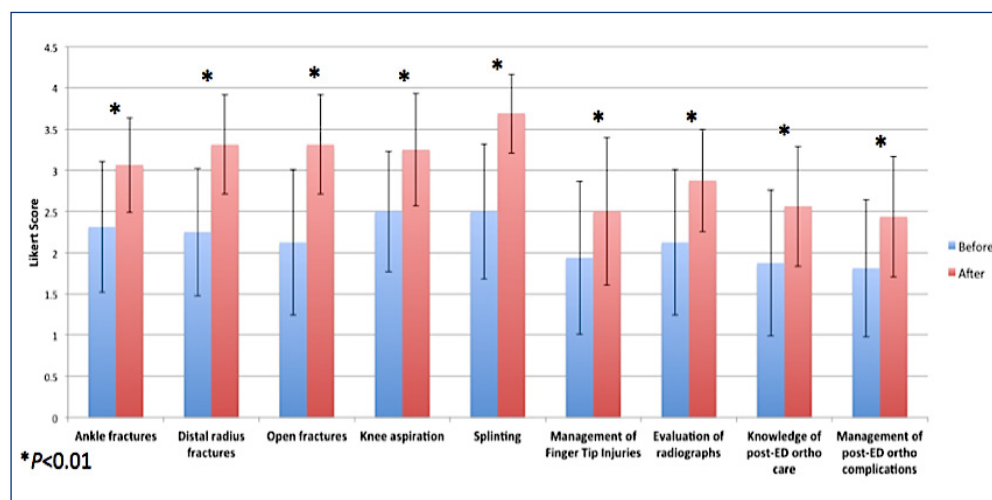
RESULTS

Seventeen PGY1 emergency medicine residents completed the orthopaedic surgery rotation at the time the survey was

distributed. Sixteen (94%) completed the questionnaire. Wilcoxon matched pairs testing based on the overall Likert score prior to and after completion of the orthopaedic rotation revealed that the overall Likert score after the rotation was significantly higher (19.4 ± 5 vs. 27 ± 3.6 ; $P=0.00098$). Comparison of each of the 9 knowledge and skill areas that were assessed by the questionnaire revealed that the respondents were significantly more comfortable in all of these core content areas (Figure 1).

Figure 1. Likert Score for Orthopaedic Skills: Before and After Rotation

Comparison of each of the 9 knowledge and skill areas assessed by the questionnaire demonstrates respondents were significantly more comfortable in all of the core content areas.



DISCUSSION

In 2004, the American College of Emergency Physicians' Emergency Medicine Foundation survey of emergency department medical directors revealed that two-thirds of responding emergency departments had insufficient subspecialty coverage. Further, one-third of the respondents reported an increase in the amount of transfers to other emergency departments to obtain subspecialty care.⁷ Inadequate physician reimbursement, fear of malpractice litigation, and impact on lifestyle have been cited as factors for these trends.³ Irrespective of the underlying reason for these trends, the fact remains that emergency medicine physicians must be prepared to provide emergent musculoskeletal care without the assistance of a consultant.

As access to consulting orthopaedic surgeons continues to decrease in community emergency departments, emergency physicians will have a larger role in the primary management of orthopaedic injuries and conditions. A dilemma arises as a result of this increasing responsibility of emergency medicine physicians. Several investigations have revealed that medical education does not adequately prepare residents to evaluate and manage musculoskeletal injuries and conditions.^{1,4-6}

In 1998, Freedman et al designed a basic musculoskeletal competency examination that was distributed to 85 PGY1

residents of various specialties on the first day of their PGY1 year.⁵ They were asked to rate each question for importance and to suggest a passing score. To assess the criterion validity, the examination was administered to eight chief residents in orthopaedic surgery. The study population comprised all eighty-five residents who were in their first postgraduate year at our institution; the examination was administered on their first day of residency. Seventy (82%) of the 85 PGY1 residents failed the examination, demonstrating that their preceding musculoskeletal education was inadequate. Although residents who completed an elective orthopaedic surgery rotation scored higher than those who completed a required orthopaedic rotation or no orthopaedic rotation at all, those residents still failed the examination with a mean score of 68.4%. In 2005, Matzkin et al recruited 334 volunteers, including medical students, residents and staff physicians, to complete an examination designed to assess basic musculoskeletal knowledge.⁴ Seventy-nine percent of the participants failed this examination, suggesting that musculoskeletal education in both medical school and non-orthopaedic surgery rotations is inadequate. In 2012, Skelley et al performed a cross-sectional study to evaluate the musculoskeletal knowledge of all of the medical students in one institution.⁶ They distributed a survey, which included a musculoskeletal examination designed to assess musculoskeletal competency, to 460 medical students. The overall mean score was 51%; 80.7% failed. Although fourth-year medical students scored higher (59%) than first-year students (37.3%), over 65% of students in both groups failed the examination. Additionally, on a scale of one to ten for subjective confidence in taking care of musculoskeletal issues, the mean first year score was 3.18 and the mean fourth year score was 4.77. Scher et al assessed musculoskeletal knowledge amongst 28 internal medicine and 18 emergency medicine residents with an online examination.¹ The mean scores were 56% and 46% for internal medicine and emergency medicine residents, respectively.

During orthopaedic residency training, management of emergent orthopaedics issues poses a steep learning curve in knowledge, skills and confidence. This is often overcome through the guidance of senior residents and attendings, supplemented with a rigorous reading schedule. Our results suggest that giving emergency medicine residents a similar opportunity to learn with an orthopaedic surgery PGY2 offers a unique opportunity to gain necessary knowledge and confidence to care for basic orthopaedic injuries and conditions. Our curriculum enhanced emergency physician confidence in the assessment and management of musculoskeletal injuries in all identified areas. This suggests that our orthopaedic rotation may serve as a useful model for musculoskeletal education for all emergency medicine residents.

There are several limitations of our investigation. First, our retrospective design subjects our data to recall bias. Second, our current sample size is small; however, the results of this preliminary assessment of the rotation are promising

given the statistically significant improvement that we observed in our sample. Third, in this preliminary investigation, only subjective confidence was addressed. An additional, prospective assessment of objective musculoskeletal knowledge and skills is warranted.

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Disclosures

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