

Association for Surgical Education

# Is there a place for medical students as teachers in the education of junior residents?

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Near-peer teaching;  
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## Abstract

**BACKGROUND:** The aim of this study was to investigate a novel resident education model that turns the traditional surgical hierarchy upside down, termed a “reverse” peer-assisted learning curriculum.

**METHODS:** Thirty surgical topics were randomized between medical students and chief residents on each clinical team, with 1 topic being presented briefly during morning rounds. An exam evaluating junior residents’ knowledge of these topics was administered before and after 1 month of presentations. A questionnaire was distributed to evaluate the junior residents’ perceptions of this teaching model.

**RESULTS:** Thirty-four residents participated. There was a significant improvement in the mean examination score (54 vs 74,  $P < .05$ ). No significant difference was noted in the mean score differentials of topics presented by either the medical students or the chief resident (21 vs 18,  $P = .22$ ). More than 80% of the residents responded positively about the effectiveness of this exercise and agreed that they would like to see this model used on other services.

**CONCLUSIONS:** This study confirms the hypothesis that medical students can teach surgical topics to junior residents at least as effectively as their chief residents.

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The medical education literature has seen a remarkable growth in the investigation of peer teaching models. These curricula have been discussed under numerous titles, including peer-assisted learning, near-peer teaching, co-coaching, and peer tutoring. Peer-assisted learning is defined as a dynamic in which “people of similar social groupings who are not professional teachers [are] helping each other to learn and learning themselves by teaching.”<sup>1</sup>

These teaching methods have been applied almost exclusively in the setting of preclinical basic science teaching and medical student clinical skills training.<sup>2</sup> In a recent survey of medical schools, 100% of respondents reported integrating peer education into their curricula.<sup>3</sup> The subjective benefits of peer-assisted learning have been discussed extensively in the literature and include alleviating teaching pressure for faculty members, offering education at students’ cognitive levels, and creating a comfortable and safe educational environment.<sup>4</sup> With such success in the medical school setting, we believed that this teaching model might be effective in a population of junior surgical residents, as an adjunct to traditional didactic teaching.

The logic behind this intervention was not simply an effort to identify an additional population of teachers. Rather, we sought to evaluate and possibly find evidence

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to support a teaching style already informally used in medical education: a teaching relationship between medical students and their seniors. Medical students provide a fresh source of knowledge and up-to-date references; they often refresh their teams with basic surgical knowledge or update their teams with interesting new research findings. This relationship, in which the teacher is actually more junior in academic level to the learner, has been described as a “reverse” teaching distance.<sup>5</sup>

The goal of this study was to investigate a novel near-peer teaching curriculum in which medical students take the role of resident educators on a general surgery service. We hypothesized that medical students would prove effective at teaching core surgical knowledge to junior residents.

## Methods

A list of 30 core surgical topics was compiled before initiating this study. This list was based on topics frequently encountered on standardized exams and an informal survey of common conditions encountered on a busy general surgery service. Topics included conditions such as diverticular disease and pancreatitis and management issues such as fluid and electrolytes (please contact the authors for a full list). A bank of questions testing the knowledge of each of these core topics was adapted from the 4th edition of Lawrence's *Essentials of General Surgery*.

Each study period was defined as a 4-week block. To assess the junior residents' baseline knowledge of these core surgical topics, each junior resident was given a preintervention exam at the beginning of the 4-week period. The exam consisted of 30 questions from the textbook question bank, 1 on each of the 30 topics. The questions were rotated every month, maintaining the format of 1 question per topic.

The 30 core topics were randomly assigned and distributed among the medical students (20 topics) and chief resident (10 topics) on each clinical team. Medical students were instructed to prepare 5-minute oral presentations on their assigned topics. They were told that they should be able to give these presentations “on the fly” directly before, during, or after team morning rounds. They were asked to provide outlines of their presentations to the chief resident early in the evening before their assigned dates. The chief resident did not provide feedback regarding the outlines. The students were instructed not to make PowerPoint slides or to read from their outlines. The chief residents' presentations were to be in the same format. The chief resident would provide supplementation to the medical students' presentations only if grossly incomplete or incorrect data were presented. Dates for each presentation were assigned, with 1 or 2 topics to be presented each day, depending on the monthly schedule. The junior surgery residents and chief resident were required to be present during all presentations. At the end of the month, the same 30-question exam given at the beginning of the month was readministered to the junior residents, and these results were our main outcome measure.

This investigation was designed as a crossover study because population size is a limiting factor in any resident education study at a single institution. The medical student presentations served as the intervention arm and the chief resident presentations as the control arm. Each month, the distribution of topics between medical students and chief resident was randomized, so that no topic was exclusively presented by either group.

This study was approved with institutional review board exempt status as an educational study. The institutional review board consent for this study was designed to remove any influence of incentive or negative repercussions from results of the preintervention and postintervention exams (ie, the junior residents studying to perform better on the exams or being concerned that poor results would be reported to faculty members). As such, the exams were deidentified after being paired for grading, and results were not shared with faculty members. The residents were not informed that the preintervention exam would be repeated at the end of the month or that the topics being presented by the medical students were included in the exam. The results of the preintervention exam were not shared with the residents and were not discussed after administration. The residents were told only that if they consented, they would be participating in an educational research study.

The mean scores of the preintervention and postintervention examinations were calculated and compared on the basis of those topics taught by the medical students versus those taught by the chief resident. Results were analyzed using Excel (Microsoft Corporation, Redmond, WA) using a paired *t* test for continuous data.

A 5-point, Likert-type scale questionnaire evaluating the junior residents' perception of this teaching model was also distributed at the end of the month, and percentage responses were calculated.

## Results

This study was conducted in a busy academic surgical residency program in Brooklyn, New York, over a 12-month period. A total of 34 junior residents participated in the study. None of the residents refused to participate. Nineteen of the residents were categorical surgical residents, 8 were preliminary surgery, 5 were from surgical subspecialties, and 2 were from family medicine. Because this study was conducted over a 12-month period, at least 1 first-year resident participated in each month of the intern year. No more than 4 junior residents were a part of the study each month. The composition of each “clinical team” varied on the basis of the medical students' and residents' schedules but consisted of 3 to 6 medical students, 1 to 4 junior residents, and 1 chief resident.

There was a significant improvement in the overall mean examination scores comparing the preintervention scores with the posttest scores (54 vs 74,  $P < .05$ ). When analyzed according to “teacher status,” the mean score for those

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